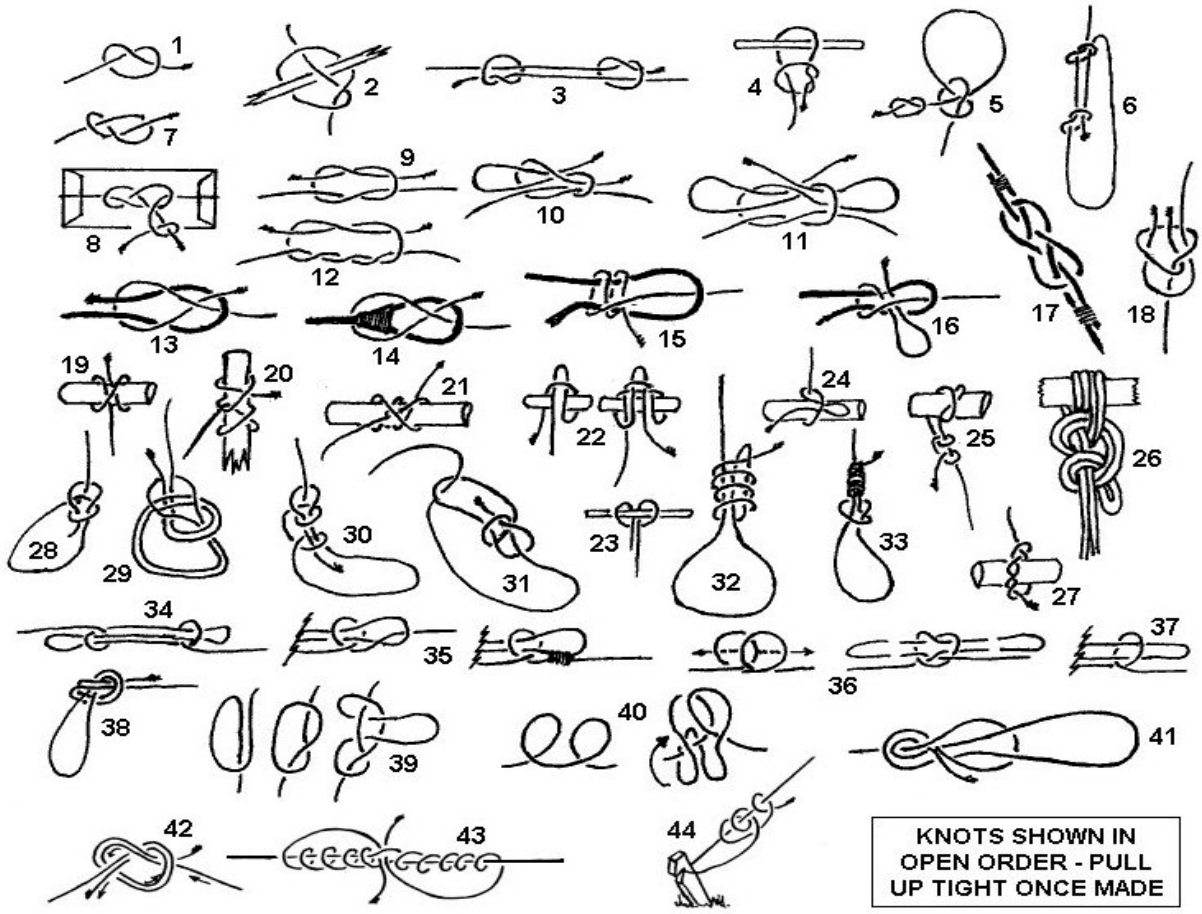
# Knots & Knotting

## Technical Terms in Knotting:

- *Standing End* – The long end of the rope too long to use or already attached to something.
- *Running End* or *Working End* – The end or the rope you are going to tie your knot with. Both ends could be your *Running Ends*.

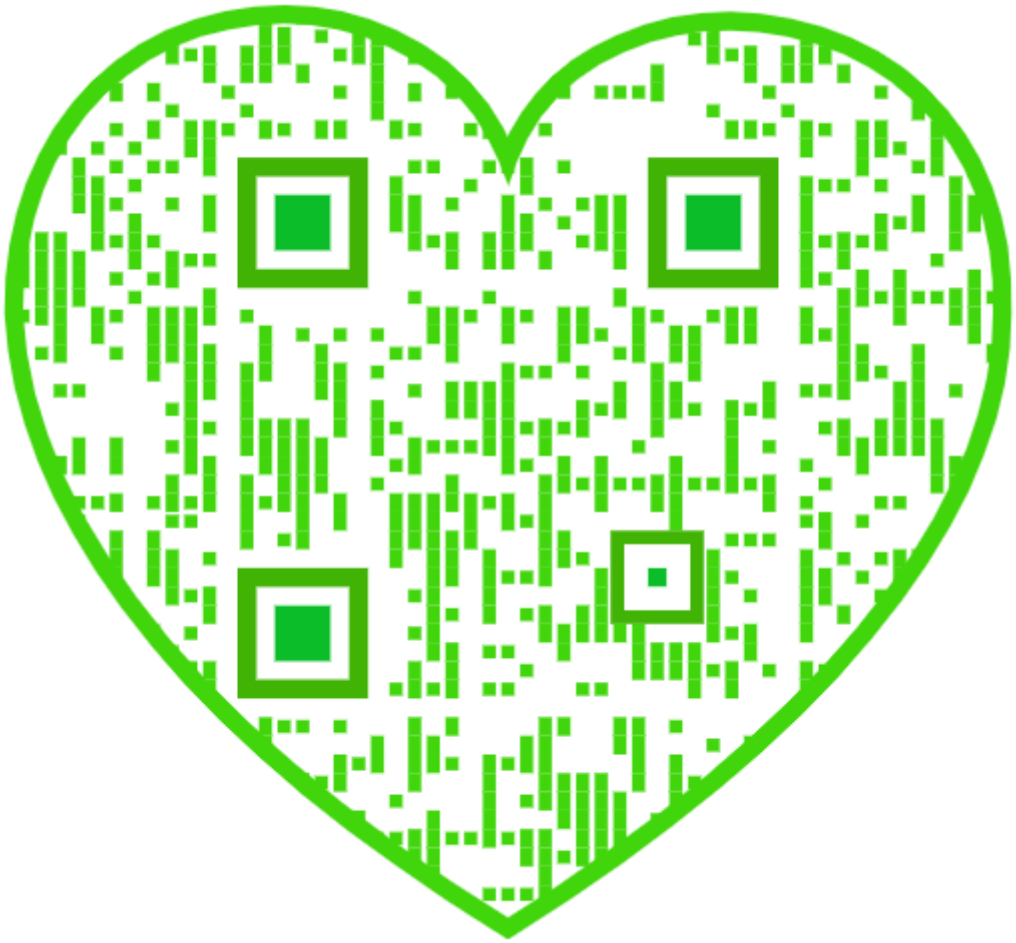
## Useful tips:

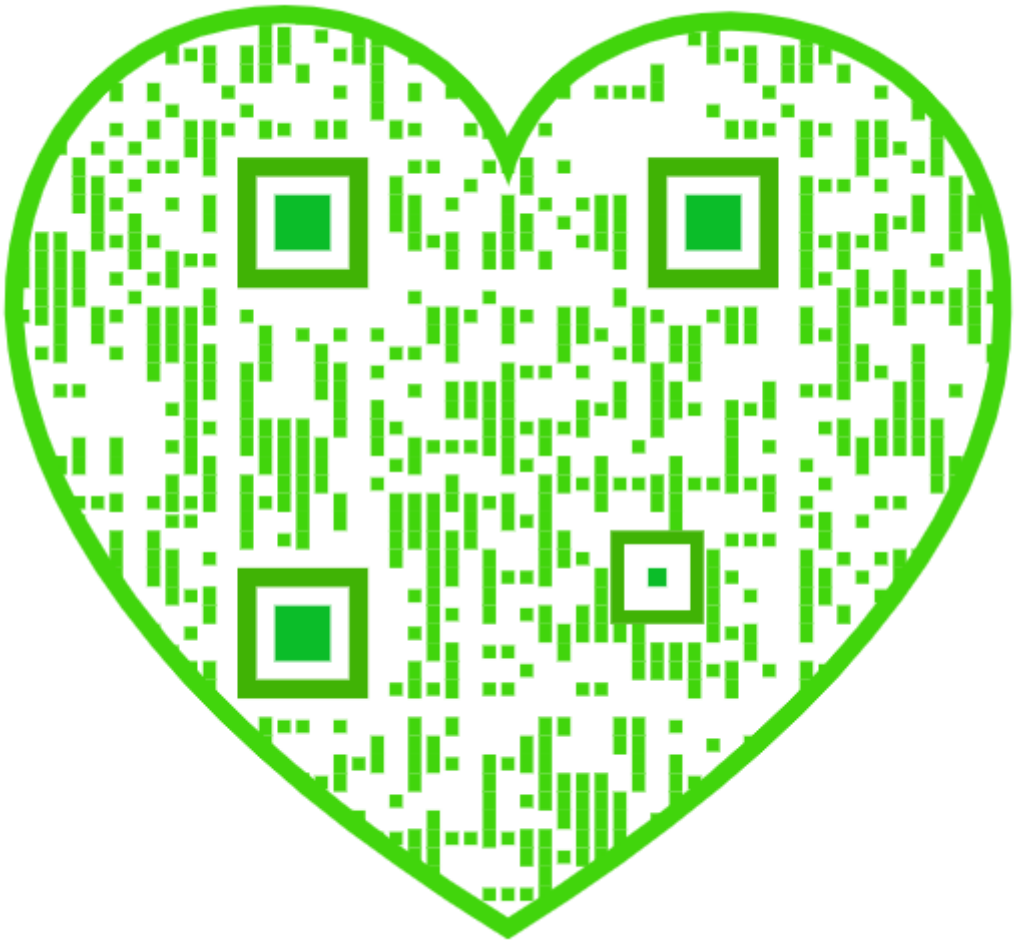
Always practise tying knots using proper rope or cord and not string. Get to know what the finished knot looks like, then you will know what you're aiming at. You should become so practised at tying knots (which is the only way to get to know them – by practice), that you should be able to tie any knot in any position, eyes closed, behind your back, in the dark, etc. Speed will also come with constant practice.




## Some Common Knots and their Uses:

1. ***Thumb Knot***: End of rope, hanking and lots more.
2. ***Marline Spike / Lever Hitch***: Spar to rope for pulling.
3. ***Fisherman's Knot***: Tying two wet / slippery ropes.
4. ***Slip Knot***: Temporary hold.
5. ***Lariat Knot***: Well balanced loop / Honda for a Lariat.
6. ***Guy-Line Hitch***: Improvise guy lines on tents.
7. ***Figure-of-eight Knot***: Same as (1) – but stronger.
8. ***Packer's Knot***: For parcels, easy tighten.
9. ***Reef Knot***: Joining rope / cord of the same thickness.
10. ***Single Slip Reef***: Temporary tie, easy to undo.
11. ***Double Slip Reef***: Tie shoes / temporary tie.
12. ***Surgeon's Knot***: Variation of (9) – holds while tying.
13. ***Sheet Bend***: Joining odd thickness ropes.
14. ***Sheet Bend***: Same as (13) but on a loop.
15. ***Double Sheet Bend***: Very unequal / wet ropes.
16. ***Swab Hitch / Slippery Sheet Bend***: For quick release.
17. ***Carrick Bend***: 'Bending' large thick ropes together.
18. ***Binder Turn***: If knot to go through machine / pulley.
19. ***Clove Hitch***: Temporary tie / starting lashings.
20. ***Rolling Hitch***: Sideways pull under strain.
21. ***Magnus Hitch***: Tie off, using rope friction to hold.
22. ***Highwayman's Hitch***: To secure, but loosen easily.
23. ***Larks Head***: Various uses like (4), easy to undo.
24. ***Half Hitch***: Temporary tie, easy to undo.
25. ***Round Turn & Two Half Hitches***: Rope under strain.
26. ***Round Turn & Two Half Hitches***: If Rope too long.
27. ***Timber Hitch***: Starting Diagonal Lashing / securing.
28. ***Bowline***: Loop at rope end / rescue loop.
29. ***Bowline-on-a-Bight***: Double loop rope end / rescue.
30. ***Water Bowline***: Prevents knot 'jamming' when wet.
31. ***Running Bowline***: Useful running noose / loop.
32. ***Hangman's Noose / Jack Ketche's Collar***: Run loop.
33. ***Hangman's Noose***: Used as a non-running loop.
34. ***Sheepshank***: Temporary method to shorten a rope.
35. ***Sheepshank***: Two methods of locking the knot.
36. ***Fireman's Chair Knot***: Two loops rope end / rescue.
37. ***Fireman's Chair Knot***: Method of locking.
38. ***Double Overhand Knot***: Quick loop at rope end.
39. ***Man Harness Knot***: Loop in middle of a rope.
40. ***Middleman's Knot***: Loop in middle of a rope.
41. ***Rover Noose***: Loop in middle or end of a rope.
42. ***Fisherman's Surgeon Knot***: To join fish line / nylon.
43. ***Blood Knot***: To join fish line / nylon filament.
44. ***Taut-line Hitch***: Temporary guy line / slip tie off





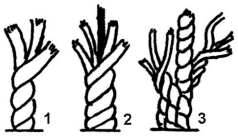
# Types & Care of Rope

Ropes and Cords are very expensive, but with proper care will last for numerous years. Ropes should be treated properly, stored in a dry place and never left out unless in use. Wet ropes should be dried before storing and all ropes inspected regularly for defects and rectified immediately. Rope ends should never be allowed to unravel.

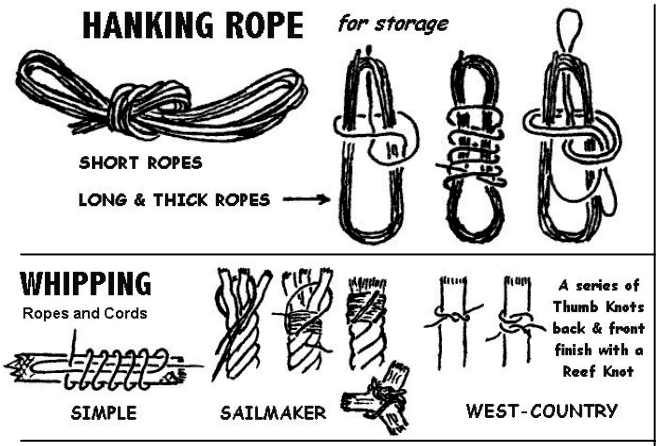
### Coiling and Laying of Rope:

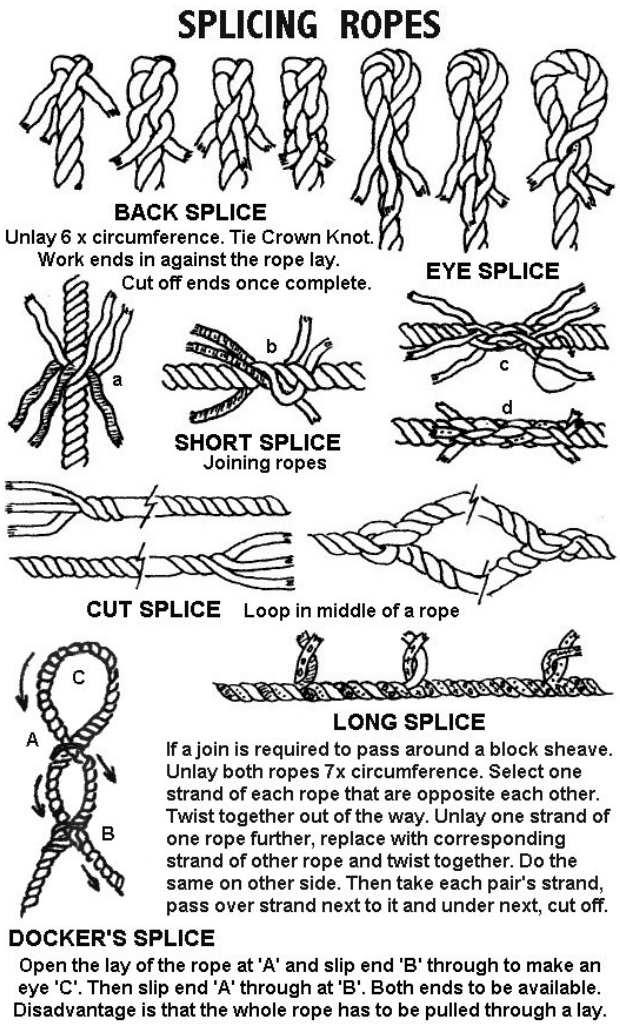
Coiling ropes properly prevents 'springy' tangle before storage. A rope laid up right handed, must be coiled right handed i.e. clockwise and vice-versa. The same applies when laying (twisting) frayed strands back into position.

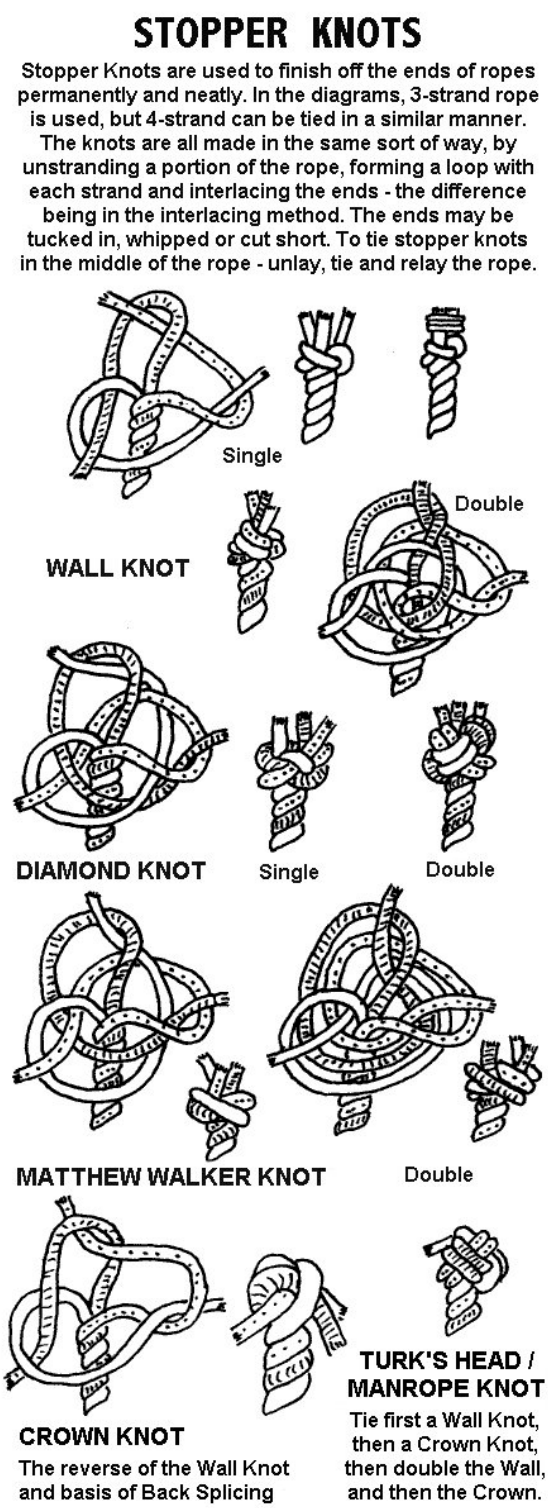
### Rope Terms:



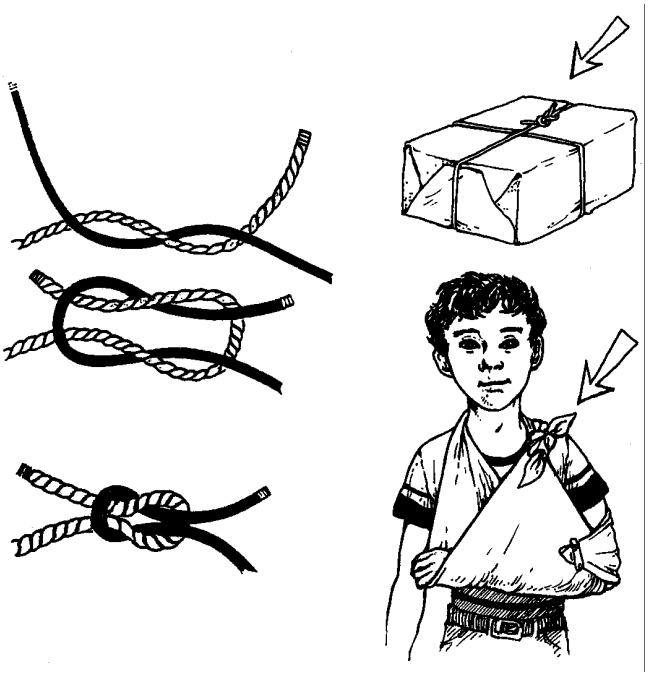

- *Hawser-laid Rope* – 3 Strands laid up right handed as shown in fig.1
- *Shroud-laid Rope* – 4 Strands laid right handed with a cord heart as in fig.2
- *Cable-laid Rope* – 3 Right hand Hawser-laid Ropes laid left handed together as in fig.3



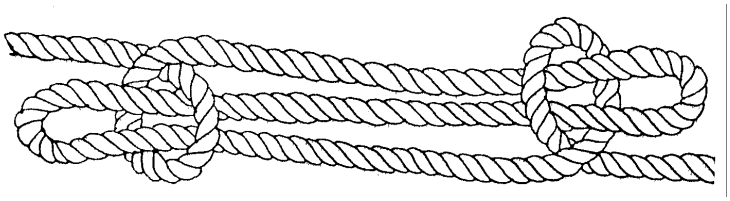


SPLICING ROPES
BACK SPLICE
Unlay 6 x circumference. Tie Crown Knot.
Work ends in against the rope lay.
Cut off ends once complete.
EYE SPLICE
a
b
c
d
SHORT SPLICE
Joining ropes
CUT SPLICE
Loop in middle of a rope
C
A
B
LONG SPLICE
If a join is required to pass around a block sheave. Unlay both ropes 7x circumference. Select one strand of each rope that are opposite each other. Twist together out of the way. Unlay one strand of one rope further, replace with corresponding strand of other rope and twist together. Do the same on other side. Then take each pair's strand, pass over strand next to it and under next, cut off.
DOCKER'S SPLICE
Open the lay of the rope at 'A' and slip end 'B' through to make an eye 'C'. Then slip end 'A' through at 'B'. Both ends to be available. Disadvantage is that the whole rope has to be pulled through a lay. Used to make a temporary eye in a rope.


STOPPER KNOTS
Stopper Knots are used to finish off the ends of ropes permanently and neatly. In the diagrams, 3-strand rope is used, but 4-strand can be tied in a similar manner. The knots are all made in the same sort of way, by unstranding a portion of the rope, forming a loop with each strand and interlacing the ends - the difference being in the interlacing method. The ends may be tucked in, whipped or cut short. To tie stopper knots in the middle of the rope - unlay, tie and relay the rope.
Single
WALL KNOT
Double
DIAMOND KNOT
Single
Double
MATTHEW WALKER KNOT
Double
CROWN KNOT
The reverse of the Wall Knot and basis of Back Splicing
TURK'S HEAD / MANROPE KNOT
Tie first a Wall Knot, then a Crown Knot, then double the Wall, and then the Crown.

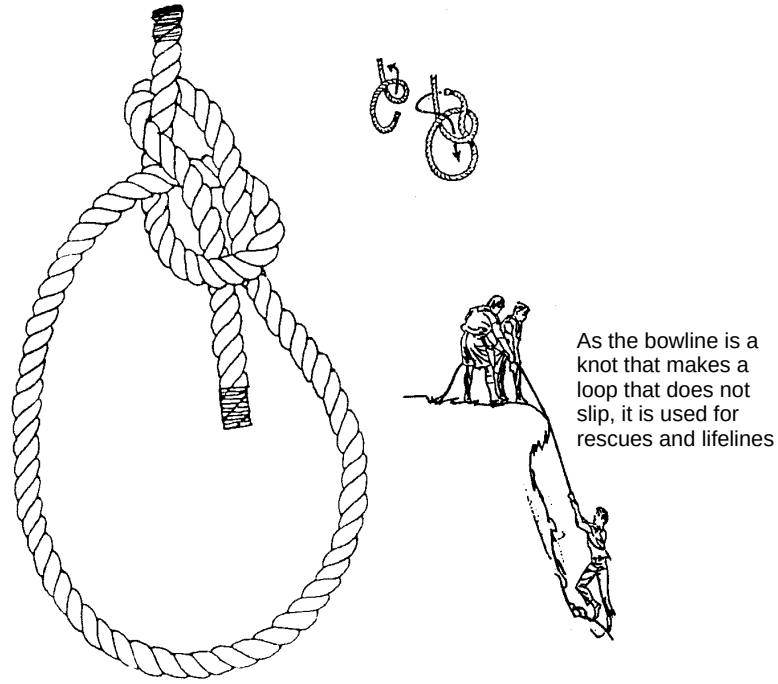
# THE SIX BASIC SCOUT KNOTS AND HITCHES



**THE REEF KNOT** A flat and easily untied knot. How to tie it: Say to yourself, "Right over left and under. Left over right and under." Then take a piece of rope or thick string and practise.

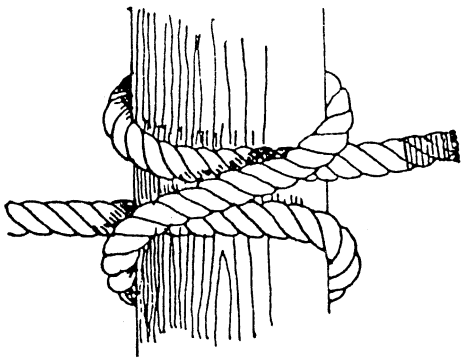


**SHEEPSHANK**
Not really a knot. Tied in the bight of a rope for shortening a rope or taking up the slack or to pass the strain over a weakened or frayed part of the rope.

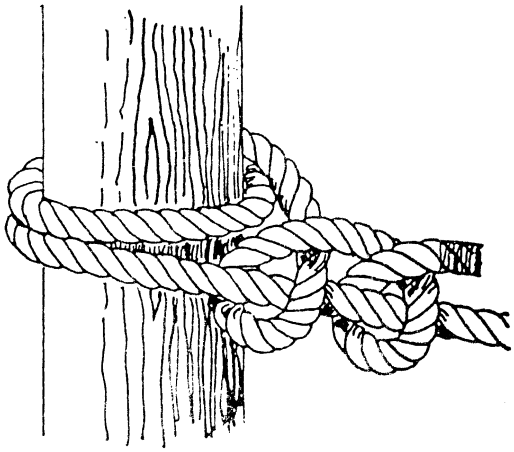


As the bowline is a knot that makes a loop that does not slip, it is used for rescues and lifelines

**BOWLINE**
This is the king of knots. The most useful and one of the simplest ways of putting a fixed loop into a rope. The basic purpose is to put a nonslip knot into a rope, and thus form an eye or loop or bight. It is easy to tie and untie and it never slips or jams. The bowline has a large number of variations but the one shown is the basic jack-of-all-trades

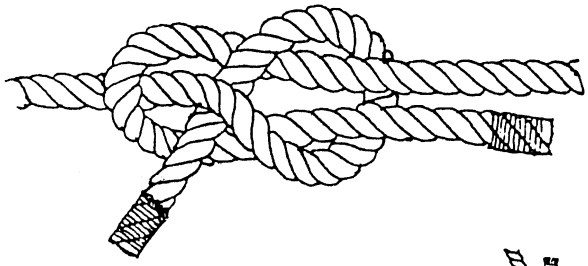


**CLOVE HITCH**
The clove hitch is easy to tie in a number of different ways and is also easy to untie. It is possibly the nearest there is to a general utility hitch. Care must be taken not to use it when a rolling hitch would serve better. It is used to start and end lashings.



**ROUND TURN-AND-TWO HALF HITCHES**
This is a very secure hitch in almost all circumstances. It is a good haulage hitch, or for securing guy lines. Also useful for tying up a boat or an animal to a pole as it can stand a lot of strain.

Make sure you can tie the Clove Hitch and Round Turn-and-Two Half Hitches quickly and securely as you will need these to start and finish lashings, which form a large part of Scout Pioneering Projects.



**SHEETBEND**
This knot, like most bends, is used for tying two ropes together. Note that to be correct the two ends should be on the same side of the knot. If the two ropes differ in thickness a double sheetbend should be used. All this is to take an extra turn around the thicker rope before finishing

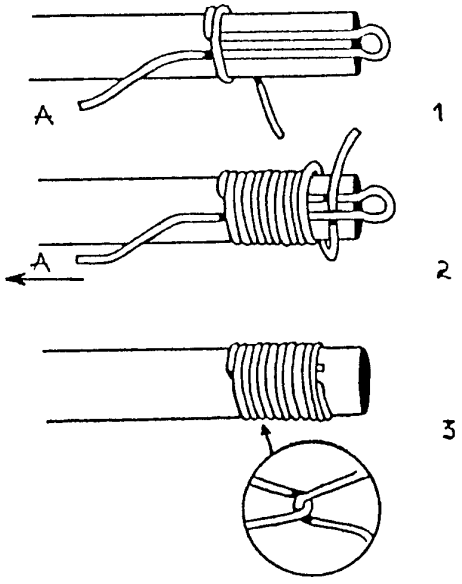
## WHIPPING

The ends of a freshly-cut rope will rapidly fray and unlay if nothing is done to prevent it. Before using a rope, whip the two ends to keep them from unravelling.

There are various methods of whipping a rope, and here we will describe three methods.

### *Simple or American Whipping*

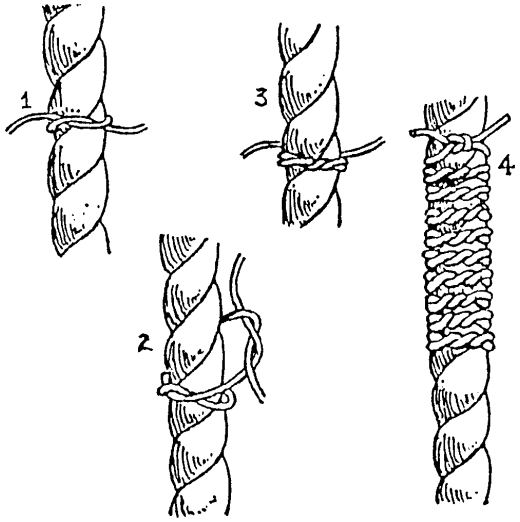
To whip a knotting rope, use a thin twine about 30 cm long. Make one end into a loop and place it at the end of the rope. End A should be fairly short. Wind the longer end of the twine around the rope and the loop, spiralling away and drawing each turn tight. When the whipping is as wide as the diameter of the rope, thread the twine through the end of the loop. Pull end A hard until the loop has disappeared under the whipping. Trim off the two ends.




Then whip the other end of the ropes. For a more permanent type of whipping see the Sailmaker's whipping below.

### *West Country Whipping*

This is the easiest form of whipping. Tie a Thumb Knot a few centimeters from the end of the rope using thin, strong twine. Then tie another Thumb Knot at the back of the rope, and continue tying Thumb Knots on each side of the rope to within about a centimeter from the end. Finish off with a Reef Knot, and trim with a sharp knife.



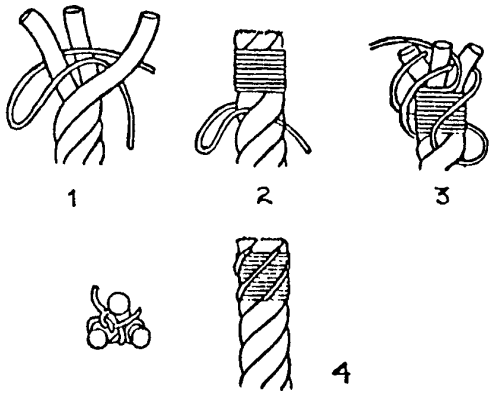

### *Sailmaker's Whipping*

1. Open the lay of the rope and place a loop of twine around one strand. Re-lay the rope.

2. Hold the loop down with one hand, leaving the short end free. With the long end of the twine make tight turns around the rope, close together, towards the end of the rope.

3. Raise the loop and slip it over the end of the strand it is around. Pull the short end to tighten. Join the ends of the twine with a Reef Knot.

4. Trim the end of the sharp knife and rub with wax.



## SPLICING

Splices are used to join any two parts of rope together permanently. A good splice has up to 95 per cent of the rope's strength, while a knot's efficiency varies from only 45 to 60 per cent of the rope's strength.

Before beginning to splice, you need a couple of tools - a sharp knife and a marlinspike. The marlinspike is the tool included in some pen-knives that most Scouts think is used for taking stones out of horses' hooves I The marlinspike is used to help you in opening the lay of the rope at the point where the strand is to be introduced. If you haven't a marlinspike handy, a 15cm nail will do the job.

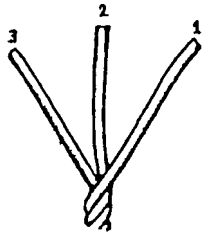
The most important step in splicing is the start. Marry the strands correctly and the remaining steps follow easily.

To properly prepare a rope for splicing, unlay the end adequately and whip each strand with a temporary whipping.

Four tucks will hold any splice providing that they are full strands (i.e. not tapered off). Tapering off is done after the fourth tuck and is performed by reducing each of the strands by one-third with a knife; tuck again with the thinner strands and then reduce the strands by another third; and finally by tucking and trimming off close.

### *Back Splice*

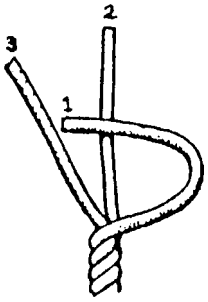
This is also sometimes called the end splice', it is used as a permanent fastening at the end of a rope to prevent unravelling. However, as it causes a bulge at the end of the rope, which might prevent it from passing through a block, for most purposes it is better to whip the end of a rope.



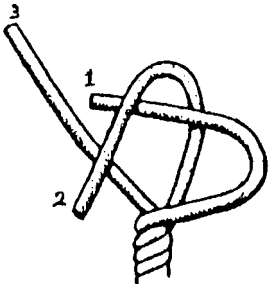

Unlay the end of the rope about 12 to 15 centimeters.

Hold the rope upright, where the unlaid strands begin, and make sure that the three strands hang down over your hand with an equal distance between each of them.

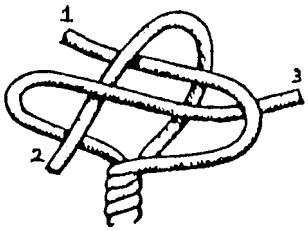
Make a Crown Knot to start the splice. This is done as follows:




Take one strand (1) and lay it over its neighbour (2), working anti-clockwise.



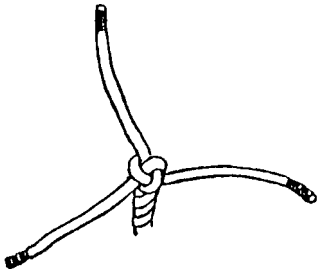

Bring down strand 2 over strand 1 and 3.



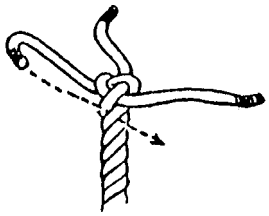

Take the end of strand 3 over strand, 2 and down through the loop made by strand 1.

Tighten each strand in turn by pulling downwards. If you have tied the Crown Knot correctly, the strands will hang down

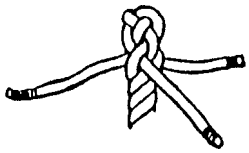
the rope with an equal distance between them. You are now ready to make the first ‘tuck’. From above the Crown Knot should look like this:



With the marlinspike or nail, lift one of the strands of the rope immediately below the Crown Knot and pass the end of one of the strands underneath it. Pull tight.



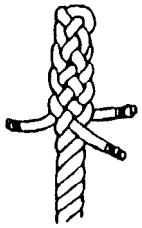
Working anti-clockwise, take the end of the next strand and pass it underneath the next laid strand of the rope. Then take the third end and pass it under the third laid strand of the rope. Pull tight. You have now completed the first ‘tuck’ and if you have done it correctly the strands will hang down with an equal distance between them. After every completed tuck this should be the case. On completion of the first tuck your Back Splice will look like this:



Now complete the second tuck by passing each of the three ends under a strand in turn as described. above. At the end of your completed tuck the strands should hang down with an equal distance between them.

Four sets of tucks will be enough, after which the ends should be trimmed of f. If you wish to taper your splice, after the fourth tuck unravel each of the ends in turn and cut one-third of the yarns (see page 2) off. Tuck again with the thinner strands; reduce the strands by another third and then finish of f the splice with another tuck. Trim off the ends.

Your untapered, untrimmed, completed Back Splice should look like this:

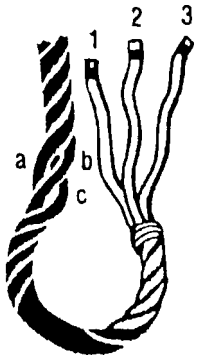


### *Eye Splice*

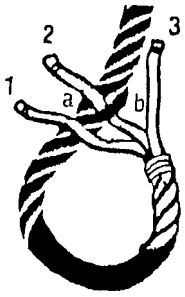
The Eye Splice is the strongest type of rope loop (an ‘eye’). Unlay the rope for a sufficient distance from the end, depending upon the size of eye required and the size of the rope. Normally, about 12 times the diameter of the rope is about right.

If you are a beginner in the art of splicing, it is a good idea to put on a temporary whipping around the rope at the point where the strands begin to unlay. This whipping should be cut off after the splice is formed.

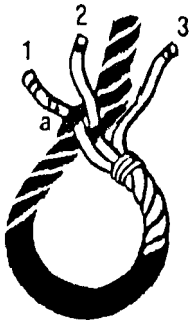
1. With the eye towards you and the standing part of the rope away from you, open out the three strands.



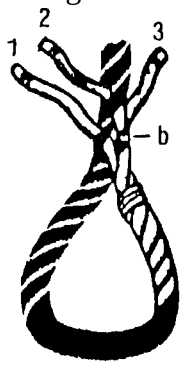

2. Take the middle strand 2 and pass it over strand ‘c’, under strand ‘b’, and out between strands ‘a’ and ‘b’.




3. Take strand 1 over strand ‘b’ and tuck it under strand ‘a’. Pull it through.




4. Tuck strand 3 under strand ‘c’ and pull it through.



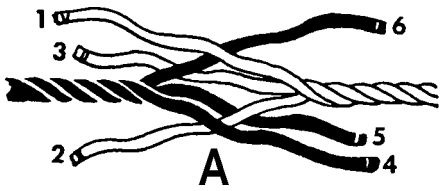

Tug on each strand in turn. If your start has been done correctly the three strands should have an equal distance between them.
Continue forming the splice by making four tucks in the same way as you did for the Back Splice described above. At the end of the fourth tuck, trim off the end of the strands, or taper the splice.

### *Short Splice*

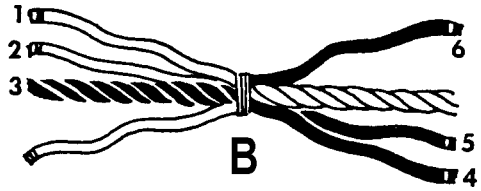
The Short Splice joins two ropes of equal size or two ends of the same rope. It is the strongest of splices, but because it increases the diameter of the rope it cannot run through a block of the correct size for the rope. Its bulk can be reduced by tapering the strands toward the end of the splice, but this weakens it somewhat.

Unlay both ends of the rope for a distance about equal to 12 times the diameter of the rope.

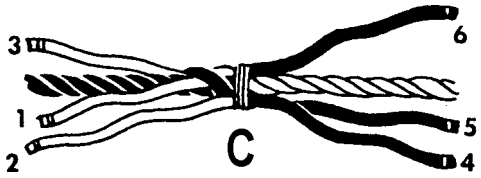
A Place the two ends of the rope together alternating the strands.



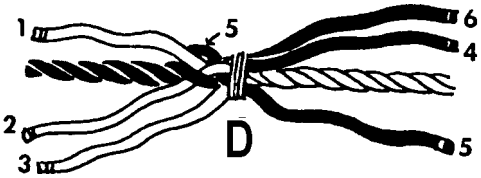
B Temporarily tie down the strands to prevent the rope unlaying further.




C Tuck strand 1 over an opposing strand and under the next strand.




D Bring strand 2 over strand 5 and under the next one.




E Bring strand 3 over strand 6 and under the next one. You have now completed the first tuck.

F Remove the temporary tie and repeat the operation described above on the other rope end. Continue tucking the strands in sequence until you have done four tucks on each rope. Trim the ends.

To taper the splice, finish several complete tucks on each rope, then remove the whippings from the strands. With a sharp knife or razor cut about one third of the yarns from each strand. Retwist the yarns, whip as before, and make another full tuck. Again, untwist and slice about one third of the remaining yarn of each strand for the remaining tuck.

For synthetic rope, follow the same method as mentioned above, but allow one additional tuck (with or without tapering).

### *Docker's Splice*

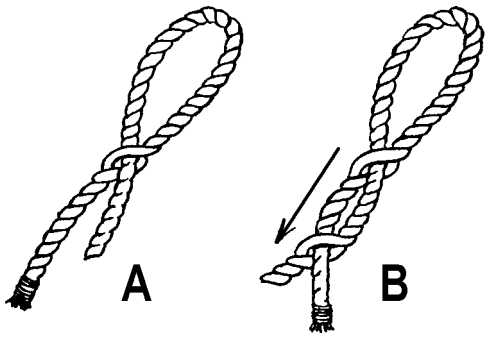
The Docker's Splice is sometimes called the Marline Eye Splice or the Tucked Eye Splice. It is the easiest of all to form. It is a quick method of making a temporary eye a rope at any point and is often used on ridge tents to hold the dolly of the main guylines.

In most splices the lay of the rope is opened and the tucks are made with the rope strands. In the Docker's Splice the whole rope is used.

Open the lay at the chosen point in the rope and tuck the whole of the running end through the raised strand to make an eye of the required size (A).

Now open the lay of the standing part of the rope immediately below the first tuck and pull the running end through until both tucks lock together (B).

As in all splices, remember to work against (or across) the lay. After the second tuck make sure that the running end is of reasonable length so that there is no danger of it pulling out.

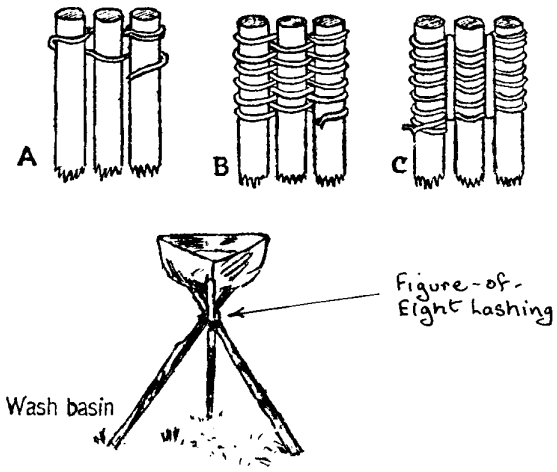


## LASHING

### *Figure-of-Eight Lashing*

You've seen a tripod? Well, the tripod is made by lashing three spars together with a figure-of-eight lashing. This lashing is also used for making a gyn, which is a tripod used with block and tackle for lifting heavy weights.

The figure-of-eight is for lashing three spars together at the top when the bottom ends are to be opened out to make a tripod. Lay the spars alongside one another, tie a Clove Hitch around one of the outside spars, and twist the running end around the standing part of the rope. Now go over and under the three spars with the rope alternatively (A) like a figure-of-eight for seven or eight times (B). Frap between each spar, and finish off with a Clove Hitch (C) on the opposite outside spar to the one on which you started.

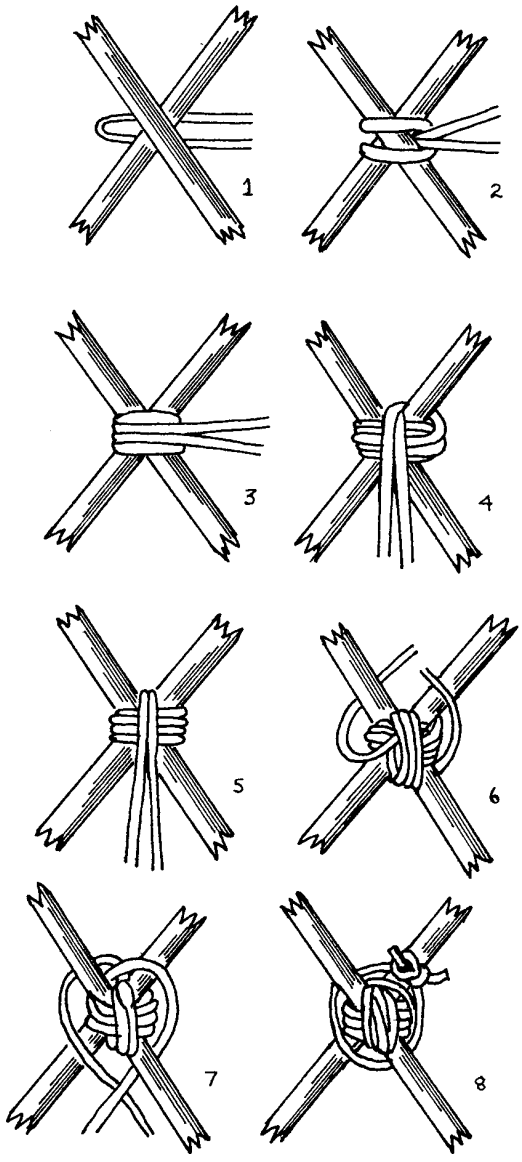



Unlike most other lashings, with the figure-of-eight lashing the wrapping turns and the two frapping turns should not be tight as the lashing tightens when the legs of the tripod are opened out.

### *The Filipino Diagonal Lashing*

The Filipino diagonal lashing serves the same purpose as the ordinary diagonal lashing. It is particularly useful when lashing thin spars or bamboo spars together when they spring apart or need to be pulled together to close a gap.

Double the lashing rope, pass the bight around the two spars, and then thread the two ends of the rope through the bight and, as with a Timber Hitch, draw the two spars together. Then continue as with the normal diagonal lashing with two wrapping turns around both spars and then two wrapping turns through the opposite angle.

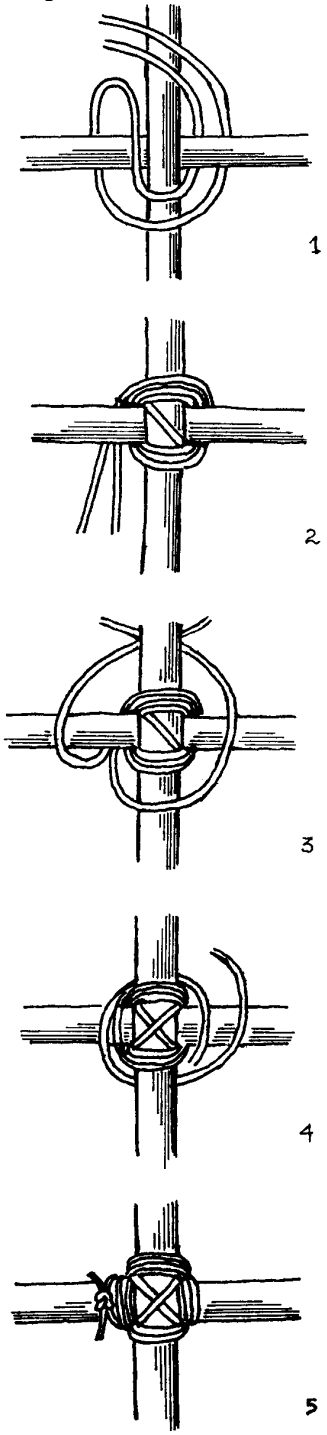



To frap, take the two ends of the double rope between the spars in opposite directions. Pull tight.

Finish off the lashing by joining the two running ends together with a Reef Knot.

### *The Japanese Square Lashing Mk I*

The Japanese Square Lashing Mark I and the Japanese Square lashing Mark II are two easy-to-tie lashings which are particularly useful when lashing thin spars or bamboo spars.




Double the rope. Start by passing the bight formed in the middle of the lashing rope around the underneath spar and then with the two running ends of the double rope side by side without crossing, take two complete wraps around both spars in the same way as in normal square lashing. Make frapping turns by passing the two running ends between the spars in opposite directions. Pull the f rapping turns tight and finish the lashing by joining the two running ends with a Reef Knot.

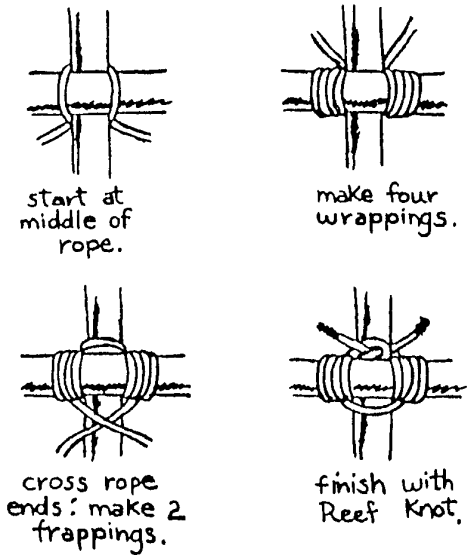
### *Japanese Square Lashing MK II*

As with the normal square lashing and the Japanese Square lashing Mark I, the Mark II lashing is used when it is not necessary to spring the spars together before lashing them.

It is probably the simplest of all the lashings to tie and the fastest.

Double the lashing rope and place the bight around the back of the upright spar above the crosspiece. Take the two running ends over the horizontal spar and cross them at the back of the upright spar (A). Bring them forward and over the horizontal spar and cross them at the back of the upright spar. Continue in this fashion until you have made four wrappings.

Make two frappings by crossing the rope ends and making the turns around the lashing between the spars. Pull the frappings tight. Finish with a Reef Knot.

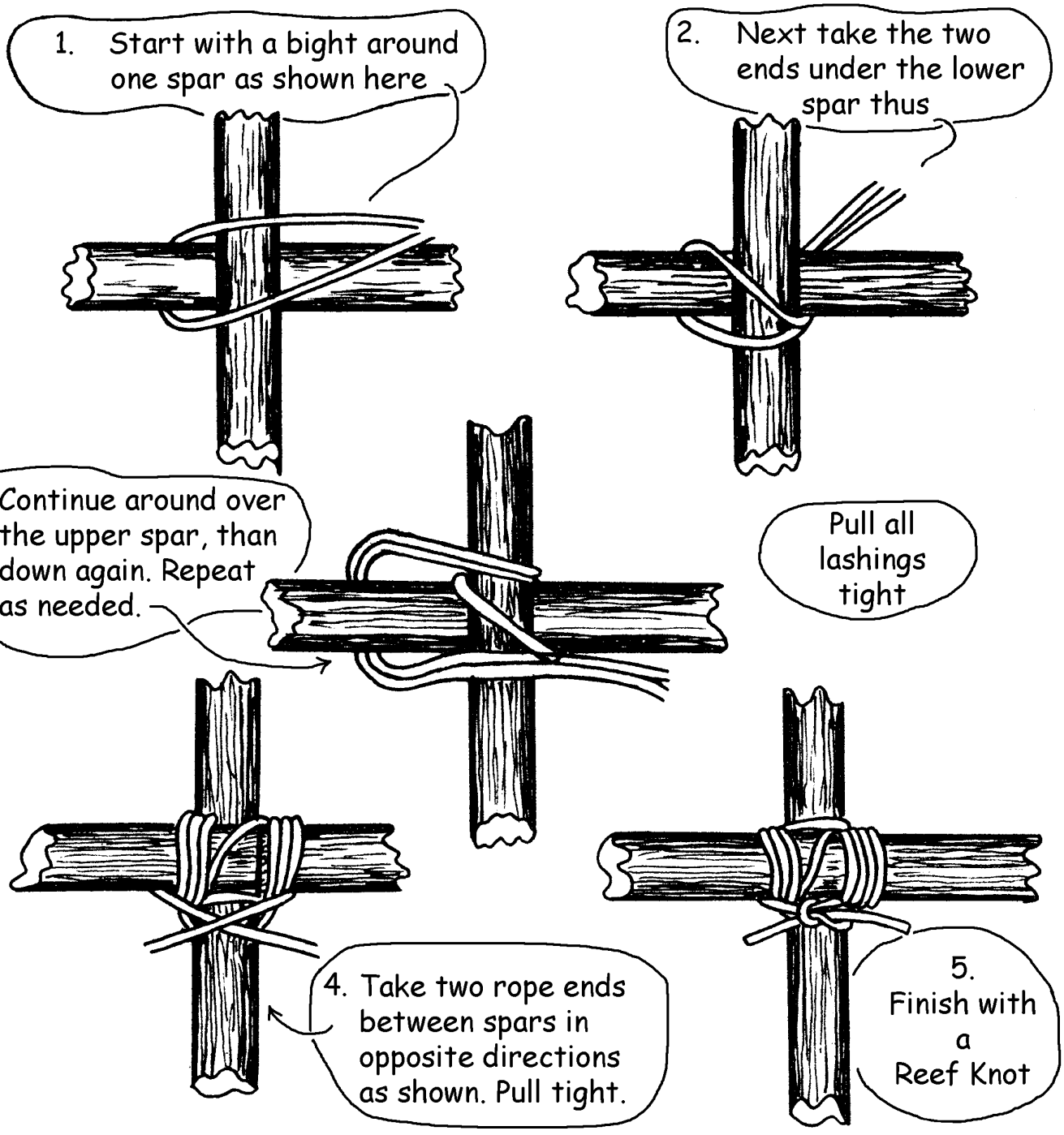


# PRO-PLAN CHART NO. 2.

## JAPANESE SQUARE LASHING

See 'Pioneering Principles' by John Thurman

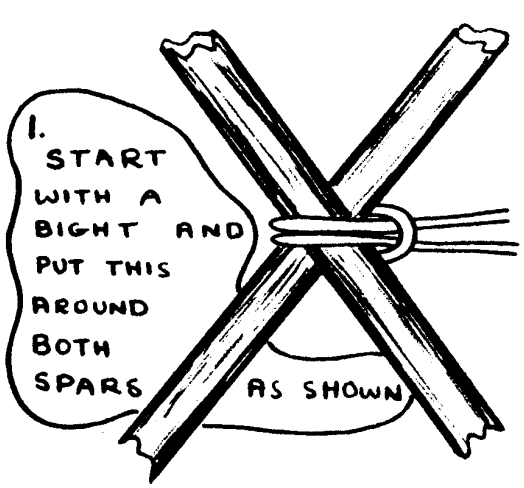
THE MOST IMPORTANT POINT OF THIS LASHING IS THAT IT DOES NOT REQUIRE THE USUAL CLOVE HITCH TO START AND FINISH, THE ONLY KNOT BEING A REEF AT THE END.

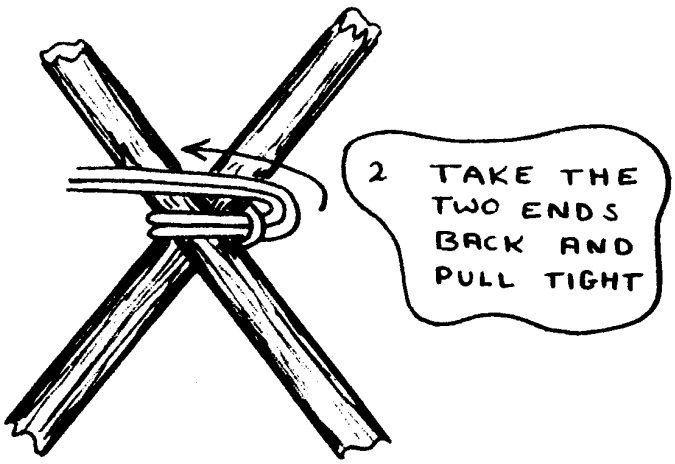

1. Start with a bight around one spar as shown here
2. Next take the two ends under the lower spar thus
3. Continue around over the upper spar, than down again. Repeat as needed.
Pull all lashings tight
4. Take two rope ends between spars in opposite directions as shown. Pull tight.
5. Finish with a Reef Knot

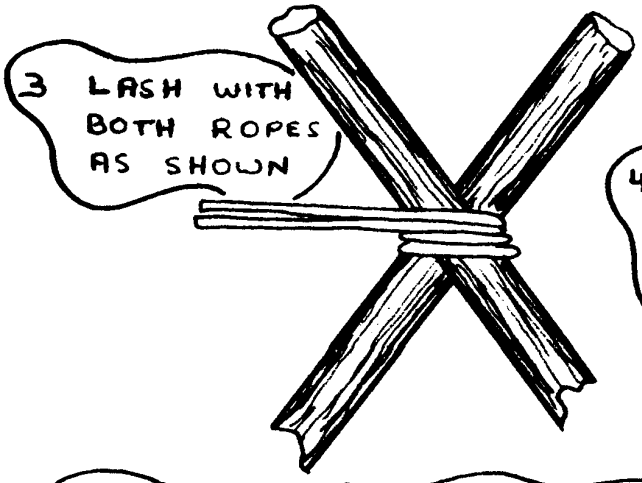
# PRO-PLAN CHART NO. 3.

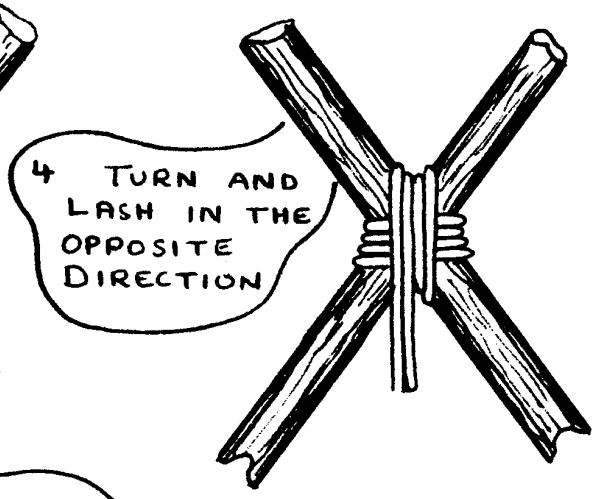
## FILIPINO DIAGONAL LASHING

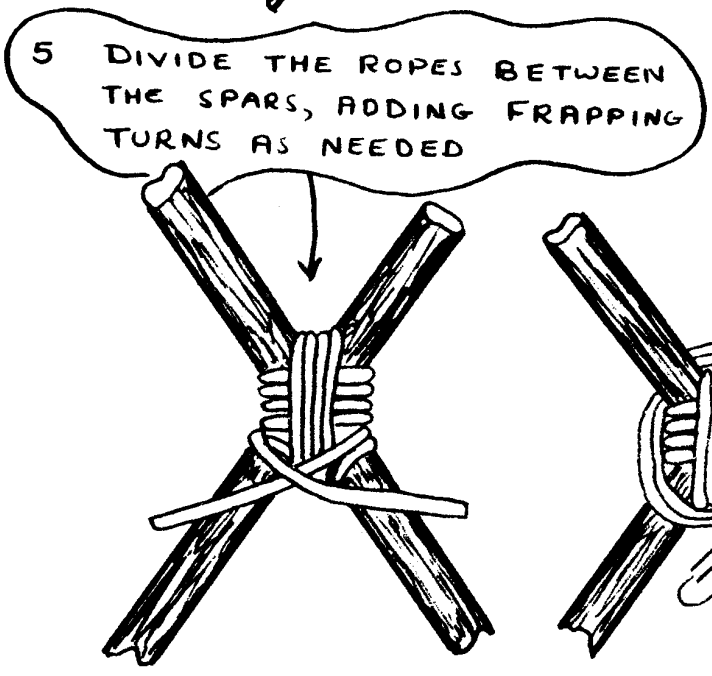
THIS IS ANOTHER LASHING WHICH REQUIRES ONLY ONE KNOT - A REEF AT THE END
REMEMBER TO PULL ALL LASHINGS TIGHT

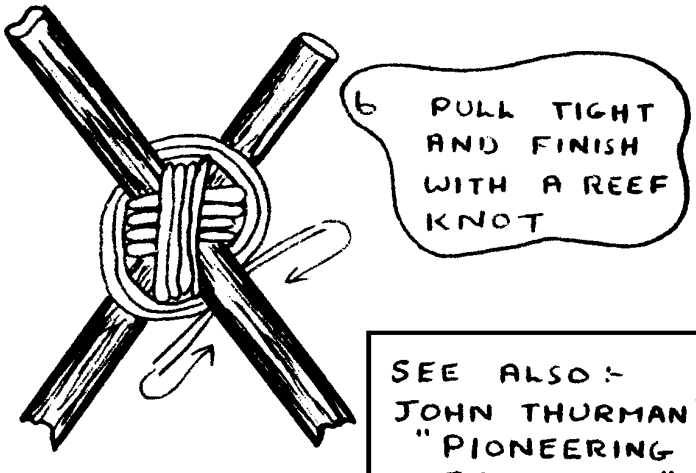


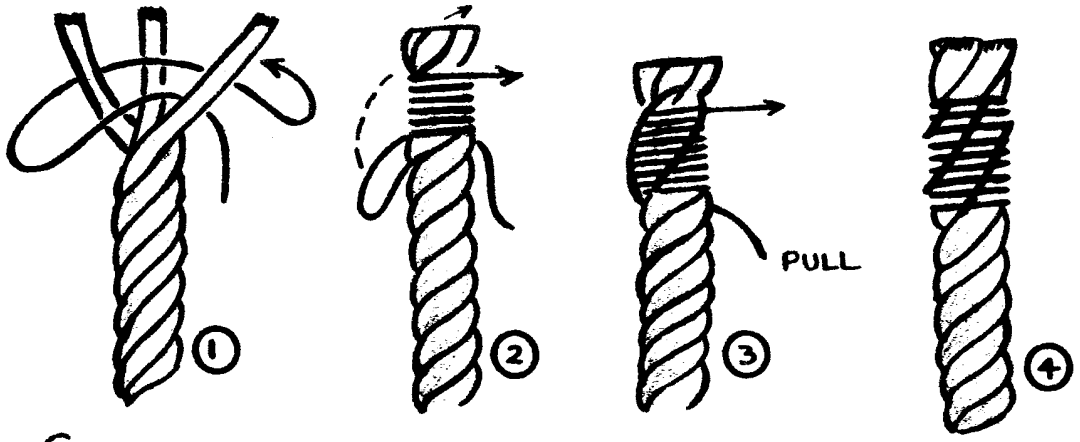




SEE ALSO :-
JOHN THURMAN'S "PIONEERING PRINCIPLES"

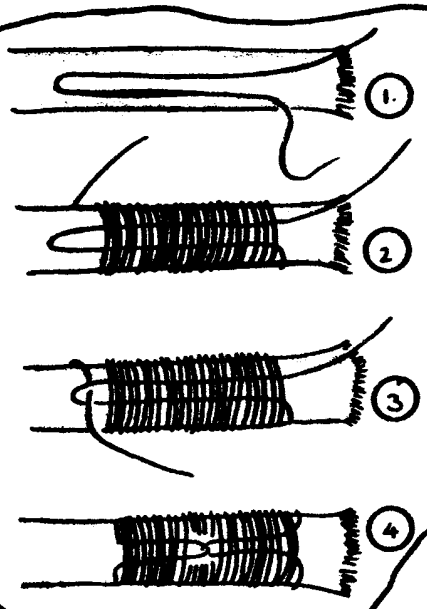
# PRO-PLAN CHART NO. 4.

## WHIPPING




**SAILMAKERS WHIPPING:** START BY UNLAYING THE THREE STRANDS.

LOOP A LENGTH OF TWINE AS SHOWN IN FIG (1) RELAY ROPE. WIND THE LONG END OF THE TWINE TIGHTLY AS IN (2) LIFT THE LOOP AND TAKE IT OVER THE SAME STRAND AROUN WHICH IT IS LOOPED, PULL THE OTHER END AS IN (3) FINISH WITH A REEF KNOT BETWEEN THE THREE STRANDS. CUT ENDS AND NEATEN ENDS OF STRANDS. (4)

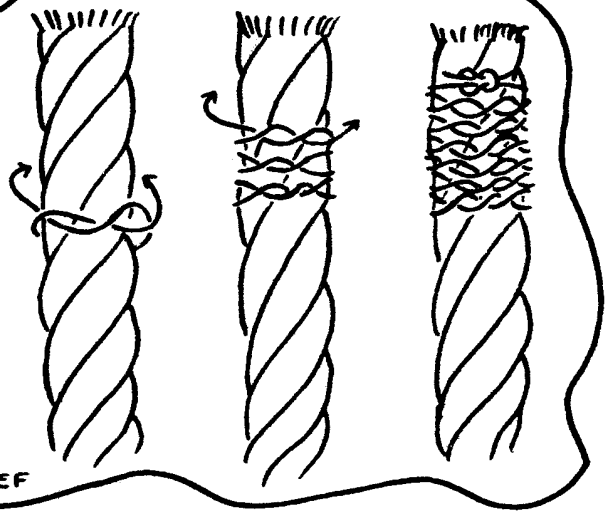



**SIMPLE WHIPPING.**

START THIS WITH A LOOP OF TWINE LAID ALONG THE ROPE. (1) NEXT PROCEED TO BIND A SERIES OF TURNS AROUND THE ROPE (2) THREAD THE END OF THE TWINE THROUGH THE LOOP (3) FINALLY PULL THE OTHER END OF THE TWINE SO THAT A LOCK IS FORMED WITHIN THE BINDING. (4) CUT OFF THE LOOSE ENDS.

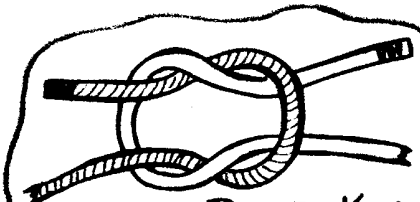
**WEST COUNTRY WHIPPING**

ORNAMENTAL. START BY MAKING A BIGHT OF TWINE AROUND THE ROPE. TIE A SIMPLE THUMB KNOT - PULL TIGHT - DO THE SAME AT THE BACK OF THE ROPE, DO THIS CONTINUOUSLY - PULL EACH KNOT TIGHT. FINISH WITH A REEF



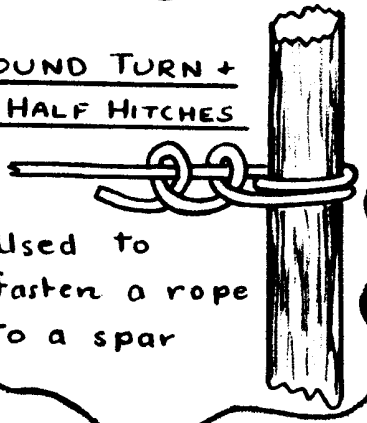
# PRO-PLAN CHART NO. 5.

## BASIC KNOTS

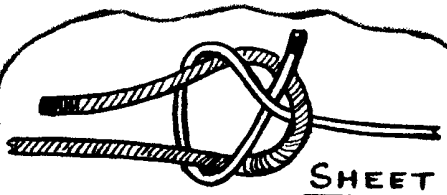


**REEF KNOT** used for First Aid and Parcels

**ROUND TURN + 2 HALF HITCHES**



Used to fasten a rope to a spar

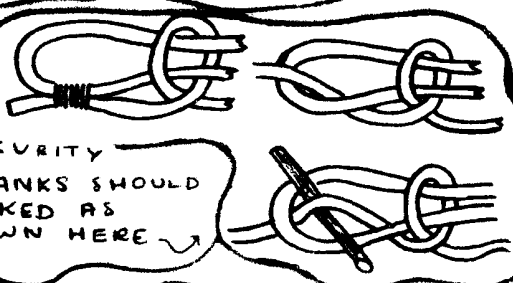


**SHEET BEND**

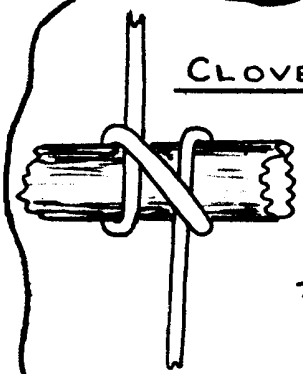
Used for joining two ropes of unequal thickness

**SHEEP SHANK**

Used for shortening or strengthening a rope ~

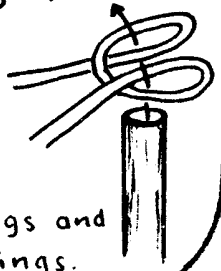


FOR SECURITY SHEEPSHANKS SHOULD BE LOCKED AS SHOWN HERE ↘



**CLOVE HITCH**

Used to fasten a rope to a spar while under strain

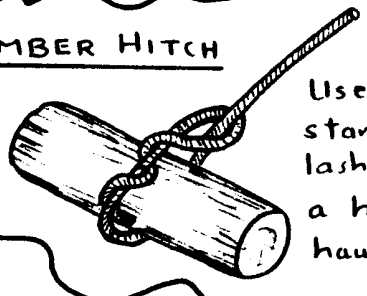


Also to start square lashings and end all lashings.

**BOW LINE**

Used for making a loop which will not slip at the end of a line

**TIMBER HITCH**



Used at the start of diagonal lashing and with a half hitch to haul logs

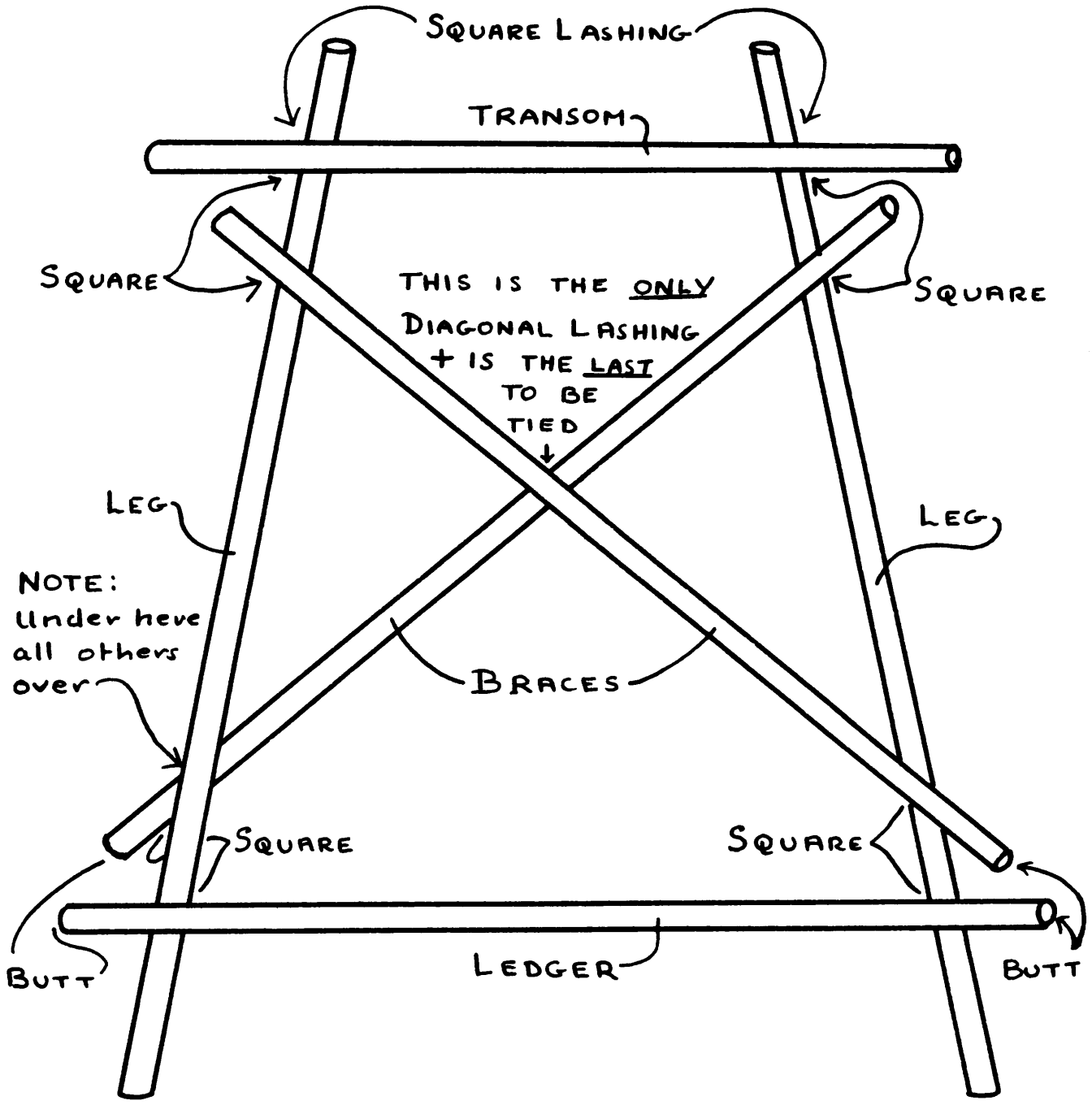
ALL KNOTS MUST BE PULLED TIGHT!

# PRO-PLAN CHART NO. 8.

## THE TRESTLE

THE TRESTLE IS THE BASIC UNIT OF NEARLY ALL PIONEERING PROJECTS.

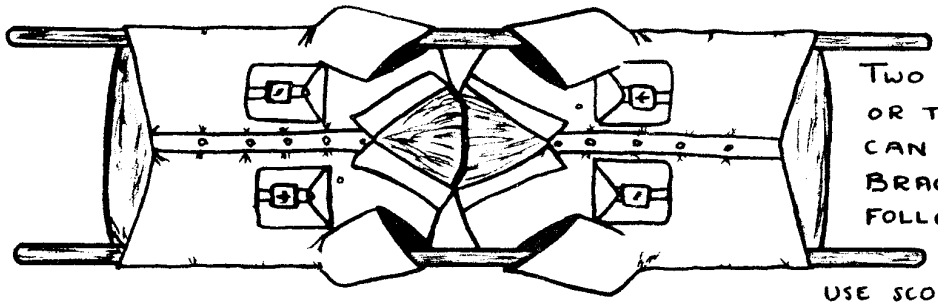
ALL LASHINGS MUST BE PULLED TIGHT AND WELL FINISHED




IN THE INTERESTS OF CLARITY NO ACTUAL LASHINGS HAVE BEEN SHOWN.

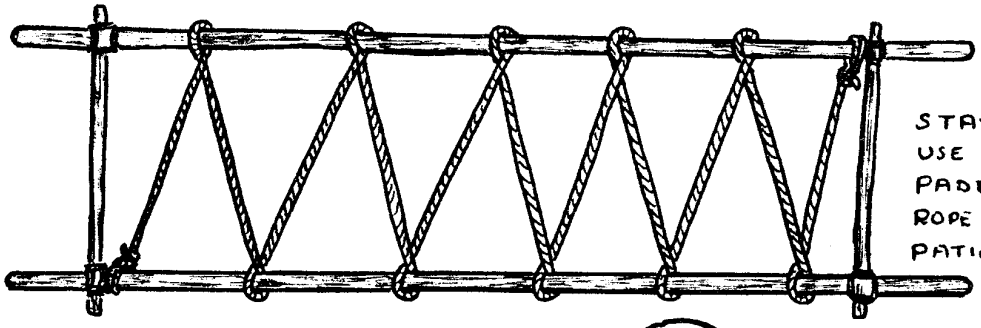
# PRO-PLAN CHART NO. 10.

## IMPROVISING STRETCHERS



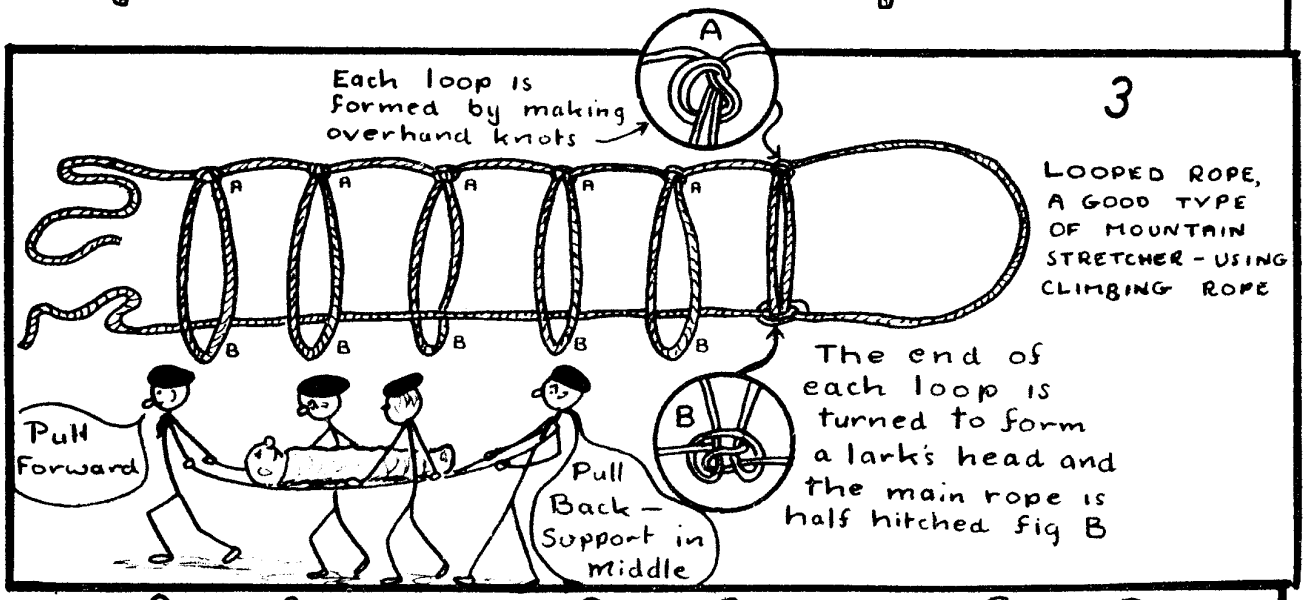
1

TWO SCOUT SHIRTS OR TWO COATS. THIS CAN BE IMPROVED BY BRACING AS IN THE FOLLOWING STRETCHER, TO STRENGTHEN USE SCOUT BELTS BENEATH THE SHIRTS



2

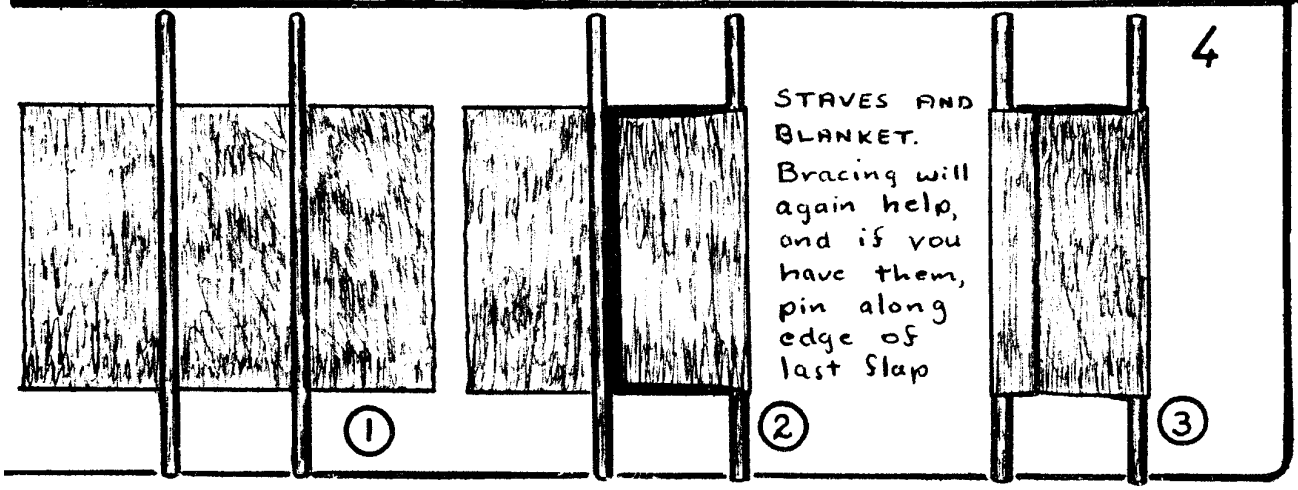
STAVES AND ROPES, USE SOME FORM OF PADDING TO PREVENT ROPE CUTTING INTO PATIENT.




3

LOOPED ROPE, A GOOD TYPE OF MOUNTAIN STRETCHER - USING CLIMBING ROPE

The end of each loop is turned to form a lark's head and the main rope is half hitched fig B



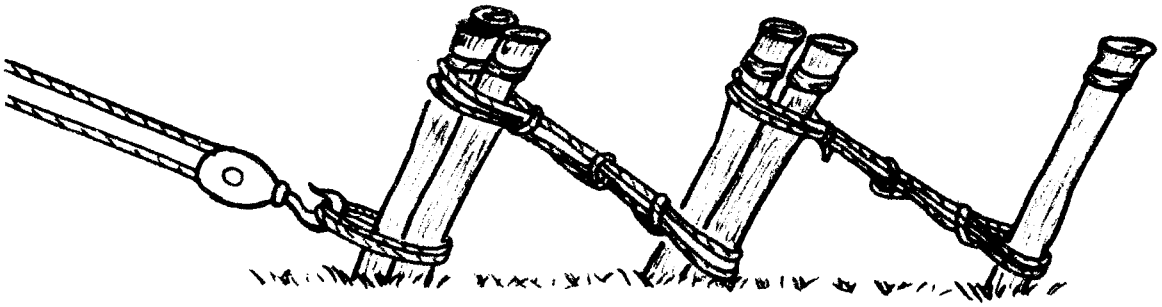

4

STAVES AND BLANKET. Bracing will again help, and if you have them, pin along edge of last Slap

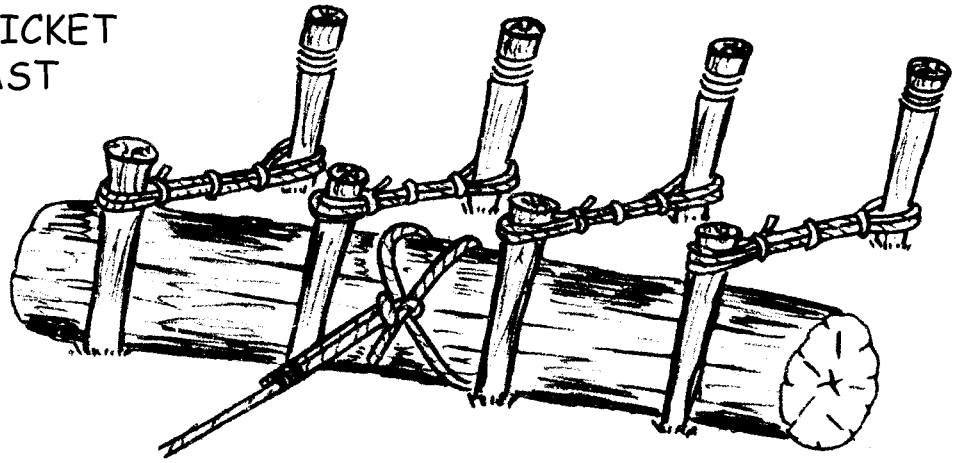
# PRO-PLAN CHART NO. 11.

## ANCHORAGES

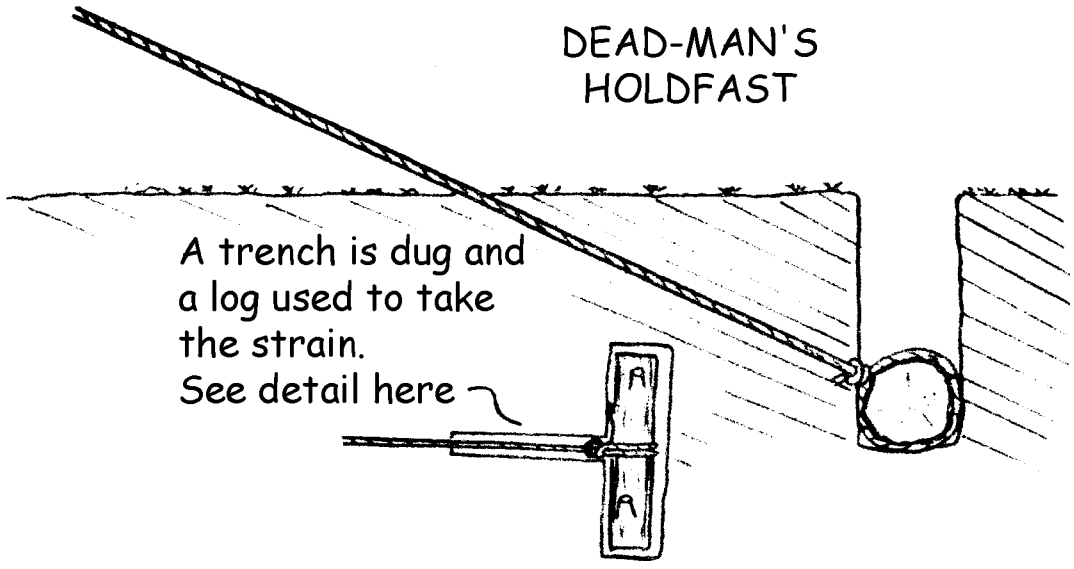
3-2-1
HOLDFAST



LOG-AND PICKET
HOLDFAST



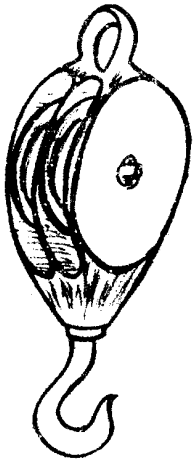
DEAD-MAN'S
HOLDFAST



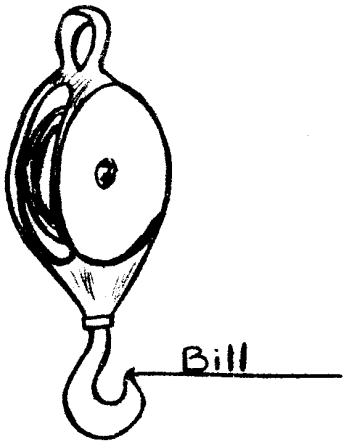
# PRO-PLAN CHART NO. 12.

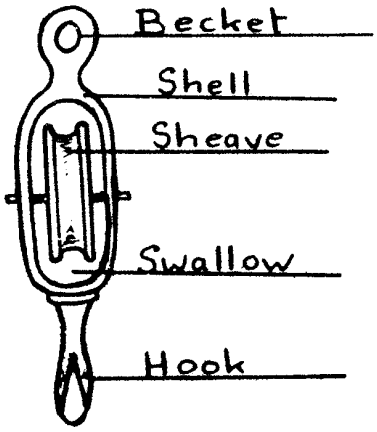
## BLOCK & TACKLE

See Also Chart No 11.



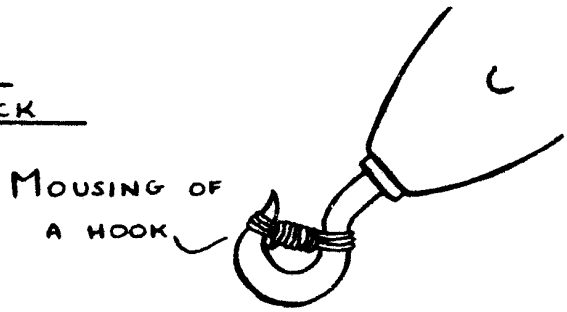
Hooked Blocks

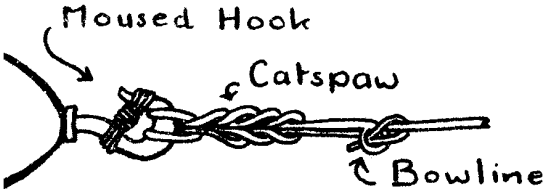


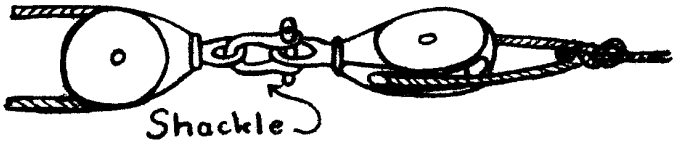

DOUBLE BLOCK

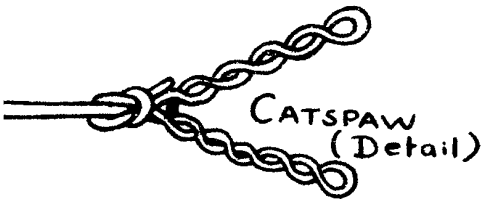
SINGLE BLOCK

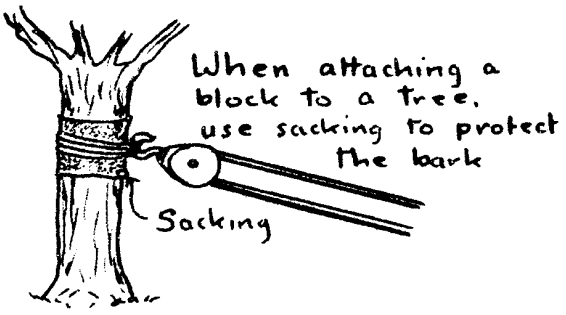


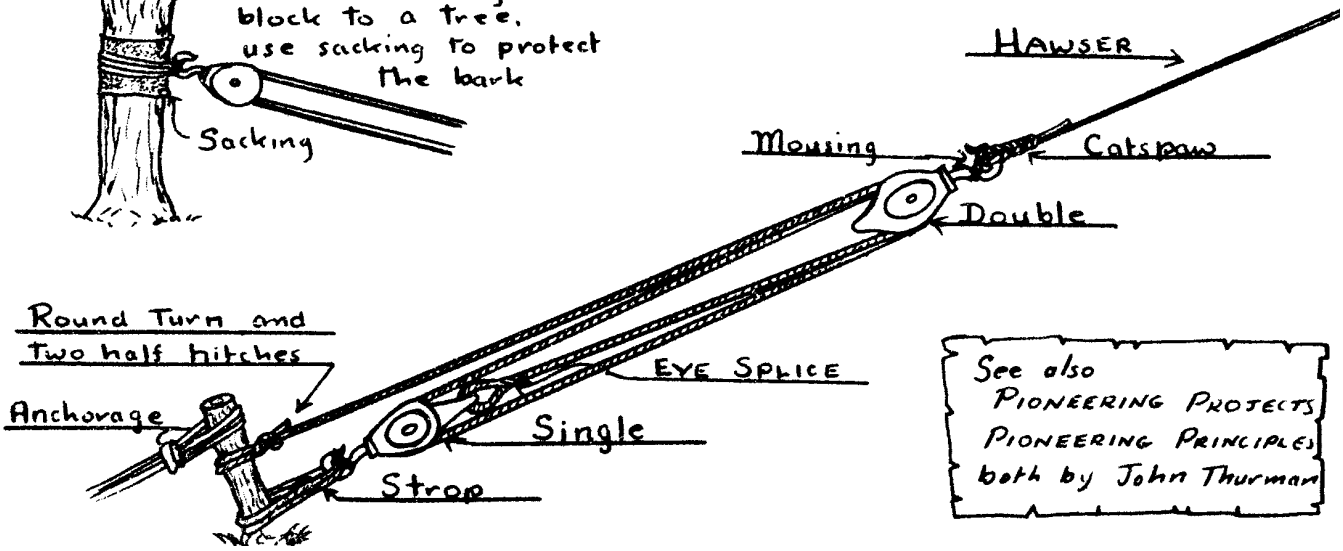




Eyed Blocks



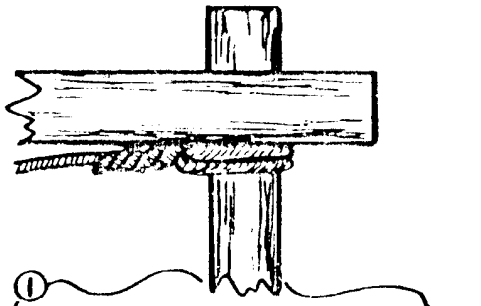



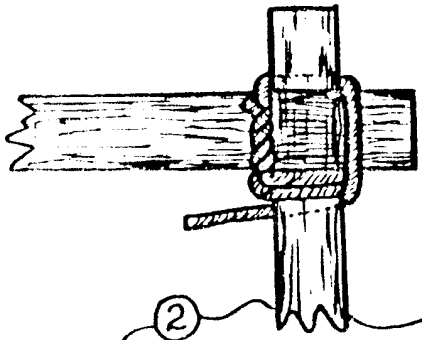

See also
Pioneering Projects
Pioneering Principles
both by John Thurman

# PRO-PLAN CHART NO. 13.

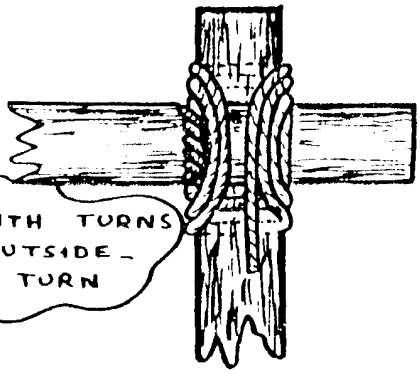
## SQUARE LASHING



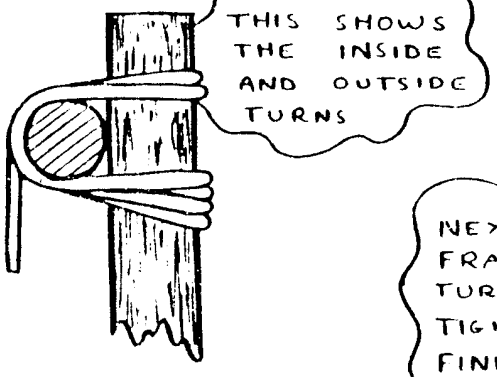
1. START THIS LASHING WITH A CLOVE HITCH. TWIST THE ROPE END TO NEATEN



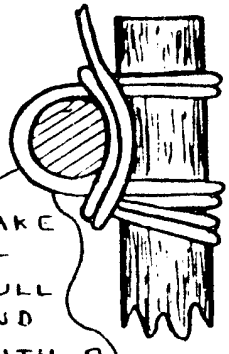
2. FOLLOW AROUND AS SHOWN HERE



3. CONTINUE WITH TURNS INSIDE AND OUTSIDE. PULL EVERY TURN TIGHTLY



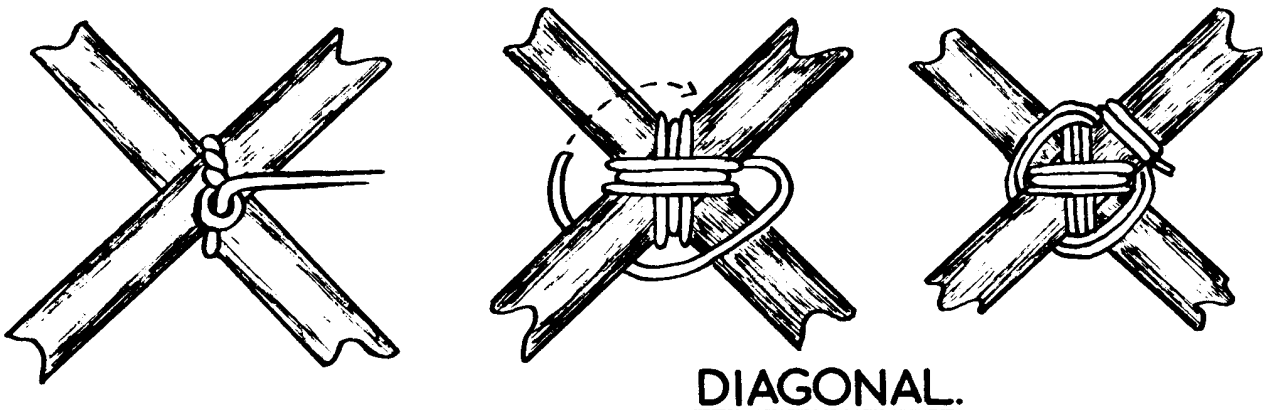
4. THIS SHOWS THE INSIDE AND OUTSIDE TURNS



5. NEXT TAKE FRAPPING TURNS, PULL TIGHT AND FINISH WITH A CLOVE HITCH.

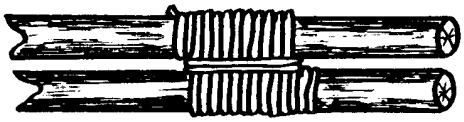
# PRO-PLAN CHART NO. 14.

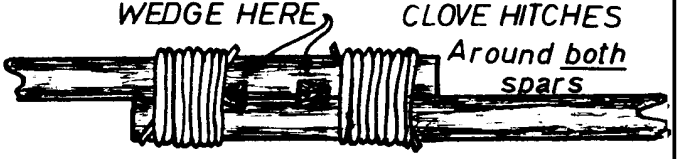
## MORE LASHINGS

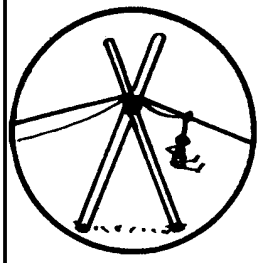


### DIAGONAL.

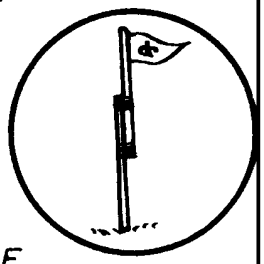
START WITH A TIMBER HITCH AROUND BOTH SPARS TAKE ROPE ACROSS AND MAKE TURNS AS SHOWN. THEN MAKE FRAPPING TURNS AND FINISH WITH A CLOVE HITCH.— NOTE! PULL ALL TURNS TIGHT.





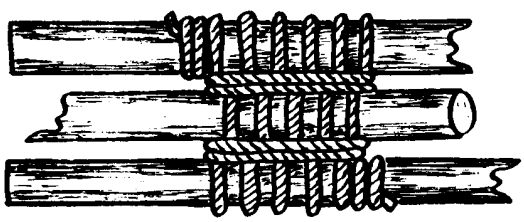



### SHEER— MARK 1 & 2.



MARK 1. START WITH A CLOVE HITCH AROUND ONE SPAR. FOLLOW UP WITH ABOUT 10 TURNS TAKE A FEW FRAPPING TURNS. DONT PULL TIGHT AS THIS LASHING IS USED FOR SHEER LEGS ~ SEE INSERT. ~ END WITH A CLOVE HITCH.

MARK 2. START WITH A CLOVE HITCH AROUND BOTH SPARS FOLLOW WITH TURNS FINISH WITH A CLOVE HITCH. WEDGES MAY BE USED TO TIGHTEN THIS LASHING— USED FOR JOINING SPARS AS IN FLAG POLE BUILDING.

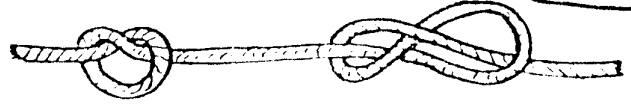


### FIGURE OF EIGHT.

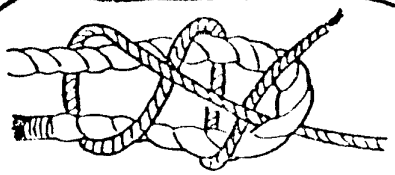
LAY SPARS ~ WITH TWO RUNNING ONE WAY AND THE THIRD IN THE OTHER ~ START WITH A CLOVE HITCH ON ONE OUTER SPAR THEN TAKE TURNS OVER AND UNDER. MAKE FRAPINGS BETWEEN SPARS. ~ END WITH A CLOVE HITCH ON OPPOSITE SPAR TO START. USED TO MAKE TRIPODS.

# PRO-PLAN CHART NO. 20.

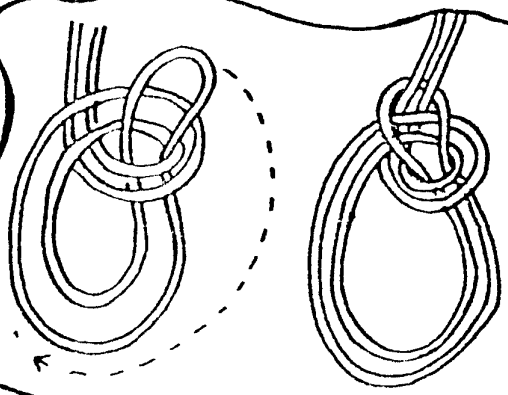
## MORE KNOTS



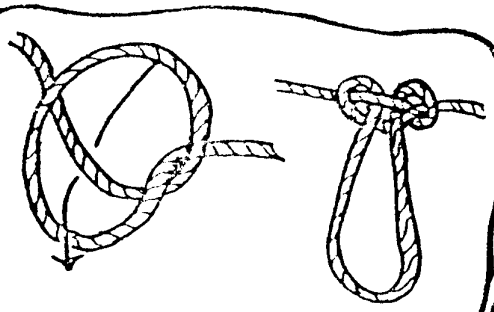
THUMB KNOT FIGURE OF EIGHT



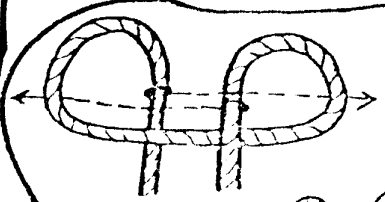
DOUBLE SHEET-BEND



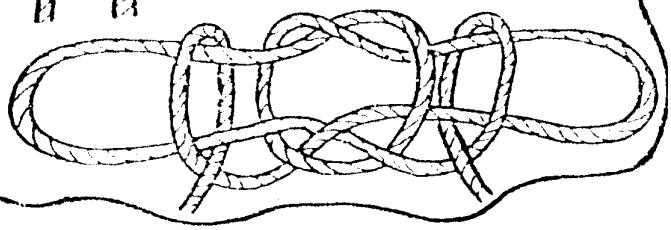
BOWLINE ON A BIGHT

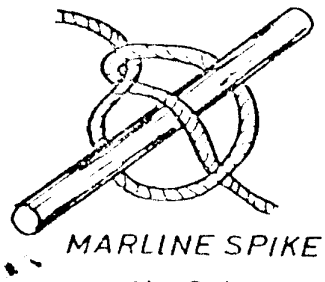


MAN HARNESS KNOT

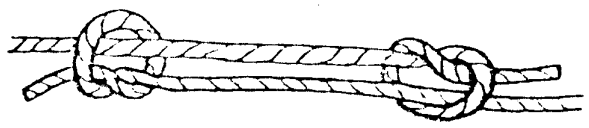


FIREMAN'S CHAIR KNOT

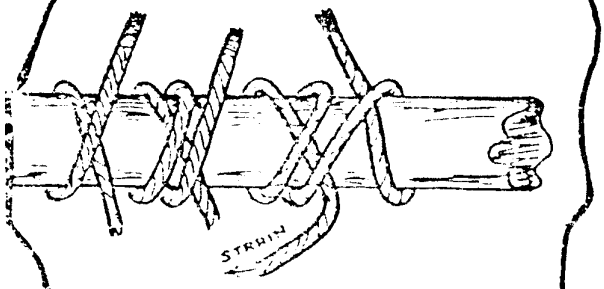




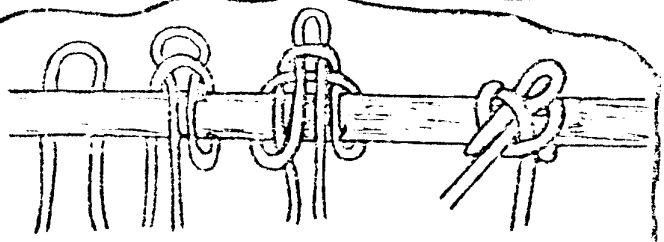
MARLINE SPIKE HITCH



FISHERMANS KNOT




ROLLING HITCH

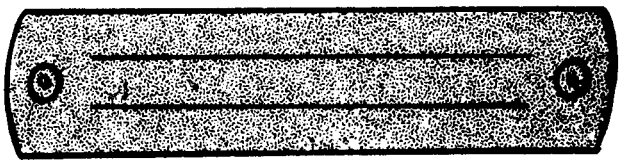


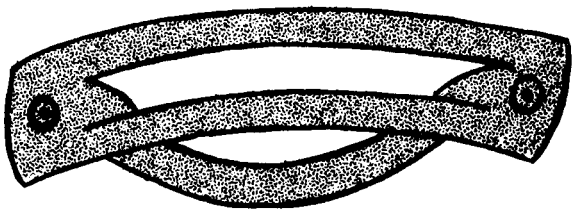
HIGHWAYMAN'S HITCH

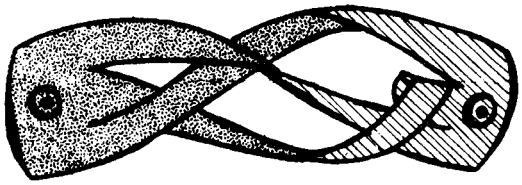
# PRO-PLAN CHART NO. 29.

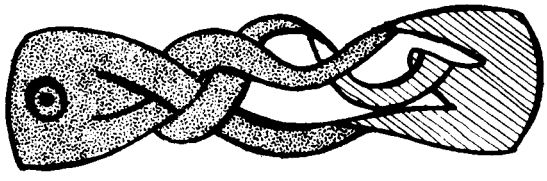
## TWO WOGGLES

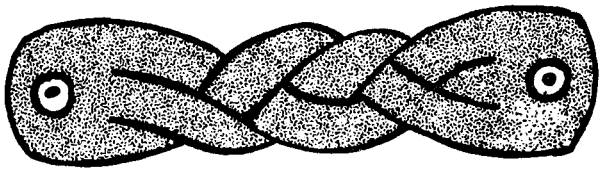
### PLAITED WOGGLE





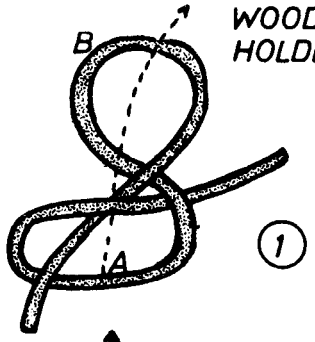


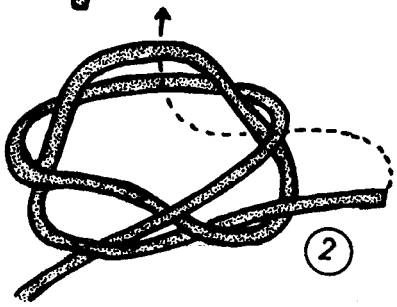


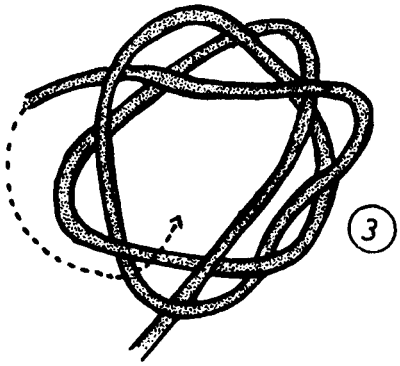


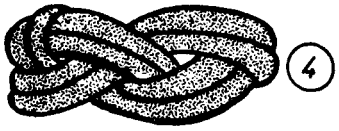
### TURKS HEAD WOGGLE

THIS WOGGLE WHEN MADE WITH TWO STRANDS OR IN LEATHER IS PART OF THE WOOD BADGE AND MAY ONLY BE WORN BY WOOD BADGE HOLDERS.




FOR GENERAL USE THIS WOGGLE MAY BE MADE WITH THREE OR MORE STRANDS IN ANY MATERIAL

# PRO-PLAN CHART NO. 39.

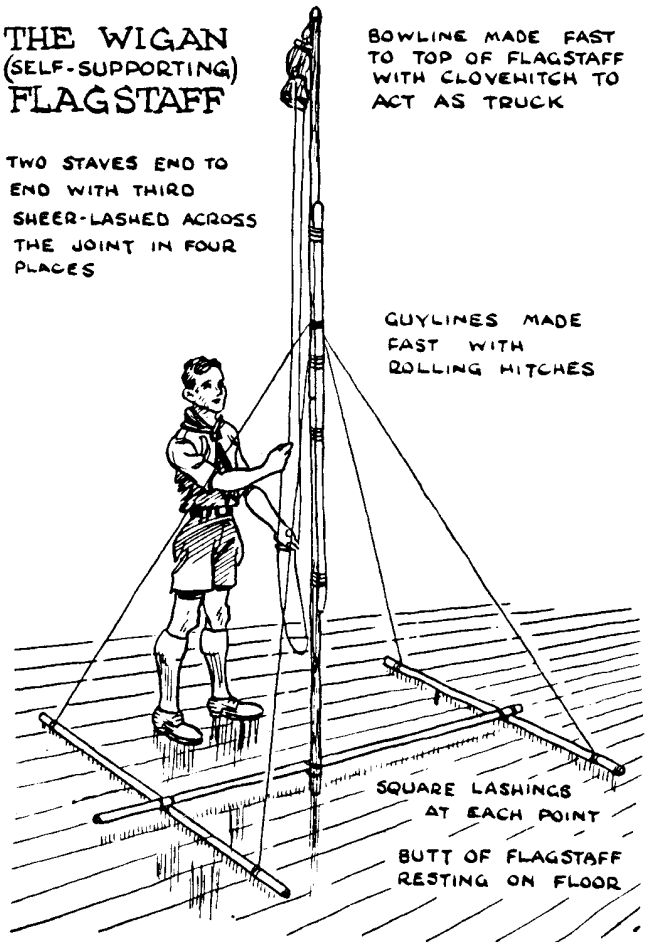
# PIONEERING PROJECTS

## THE WIGAN (SELF-SUPPORTING) FLAGSTAFF

TWO STAVES END TO END WITH THIRD SHEER-LASHED ACROSS THE JOINT IN FOUR PLACES

BOWLINE MADE FAST TO TOP OF FLAGSTAFF WITH CLOVEHITCH TO ACT AS TRUCK

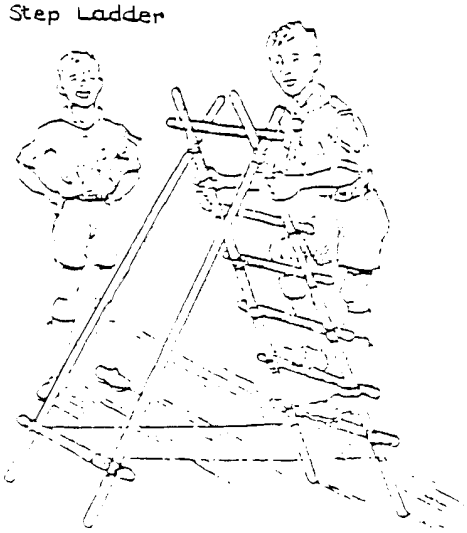
GUYLINES MADE FAST WITH ROLLING HITCHES



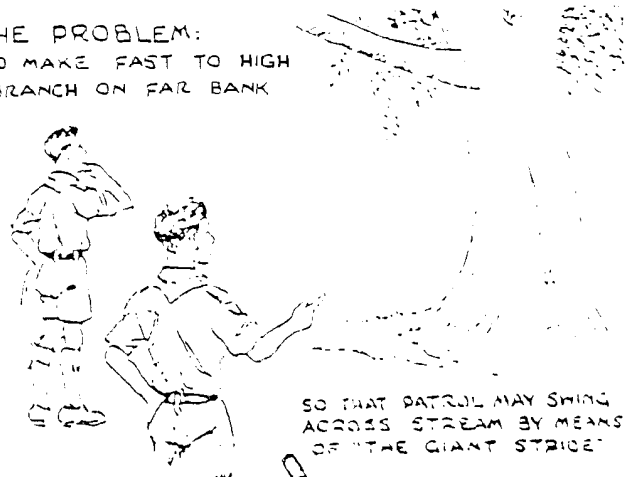
SQUARE LASHINGS AT EACH POINT

BUTT OF FLAGSTAFF RESTING ON FLOOR

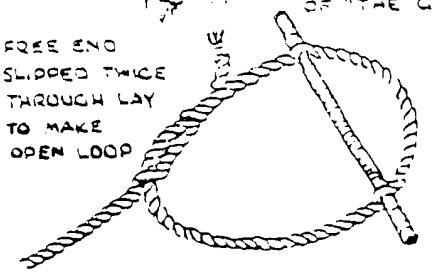
Step Ladder



THE PROBLEM:
TO MAKE FAST TO HIGH BRANCH ON FAR BANK

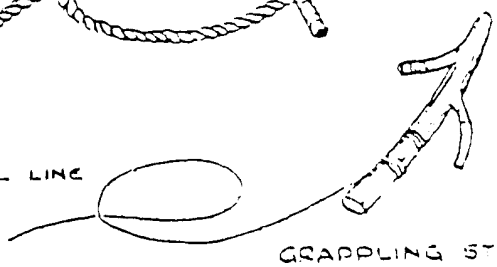


SO THAT PATROL MAY SWING ACROSS STREAM BY MEANS OF "THE GIANT STRIDE"



FREE END SLIPPED TWICE THROUGH LAY TO MAKE OPEN LOOP

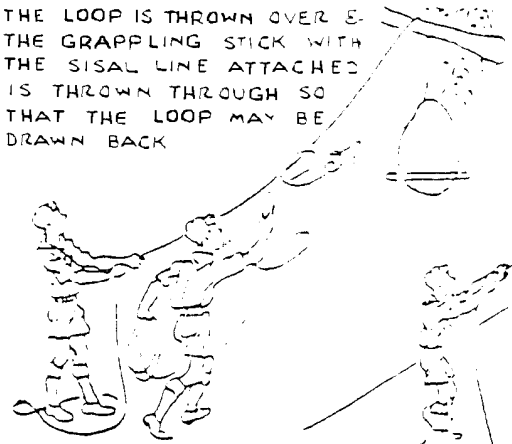
STICK SLIPPED THROUGH LAY TO ACT AS "SPREADER"



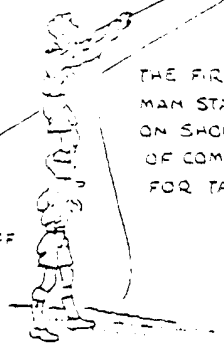
SISAL LINE

GRAPPLING STICK

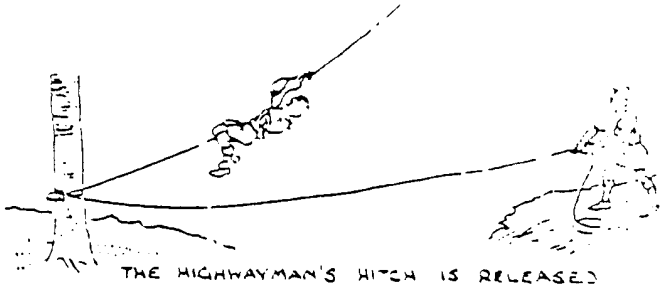
THE LOOP IS THROWN OVER THE GRAPPLING STICK WITH THE SISAL LINE ATTACHED IS THROWN THROUGH SO THAT THE LOOP MAY BE DRAWN BACK



THE FIRST MAN STANDS ON SHOULDERS OF COMPANION FOR TAKE-OFF



THE LAST MAN OVER MAKES THE ROPE FAST ON THE TAKE-OFF SIDE WITH HIGHWAYMAN'S HITCH, PASSES FREE-END BACK ACROSS STREAM & CLIMBS ROPE TO GAIN HEIGHT

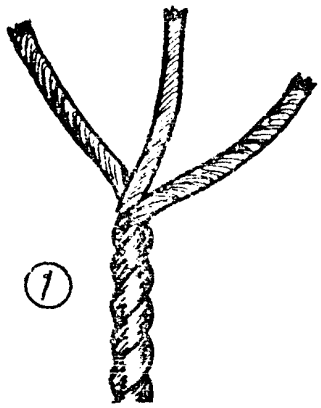


THE HIGHWAYMAN'S HITCH IS RELEASED & THE SCOUT SWINGS, OR IS DRAWN, ACROSS

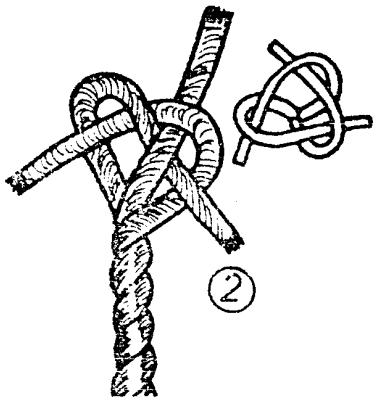
# PRO-PLAN CHART NO. 42.

## SPLICING 1

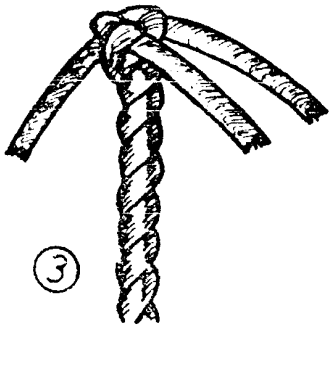
## BACK SPLICE.

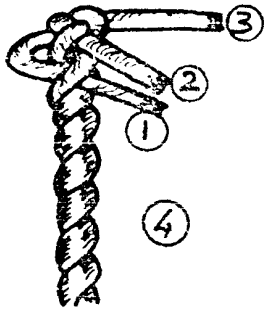


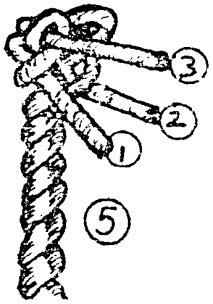

Unlay the rope for a distanc of about six times its circumference

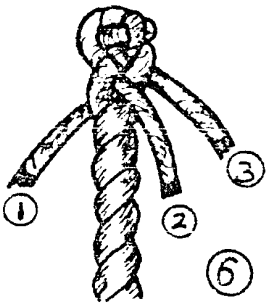


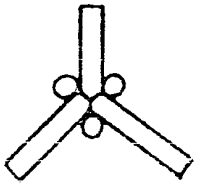

Make a crown knot and pull this tight



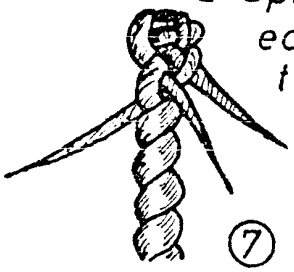



Start with one strand ~ take it over it's own neighbour and under the following strand. Repeat with nos 2+3 and continue in the same way until the end is reached

Before ending a splice taper each strand to create a tidy finish



After completing a splice roll it under foot to make it smooth then singe off the fuzz.

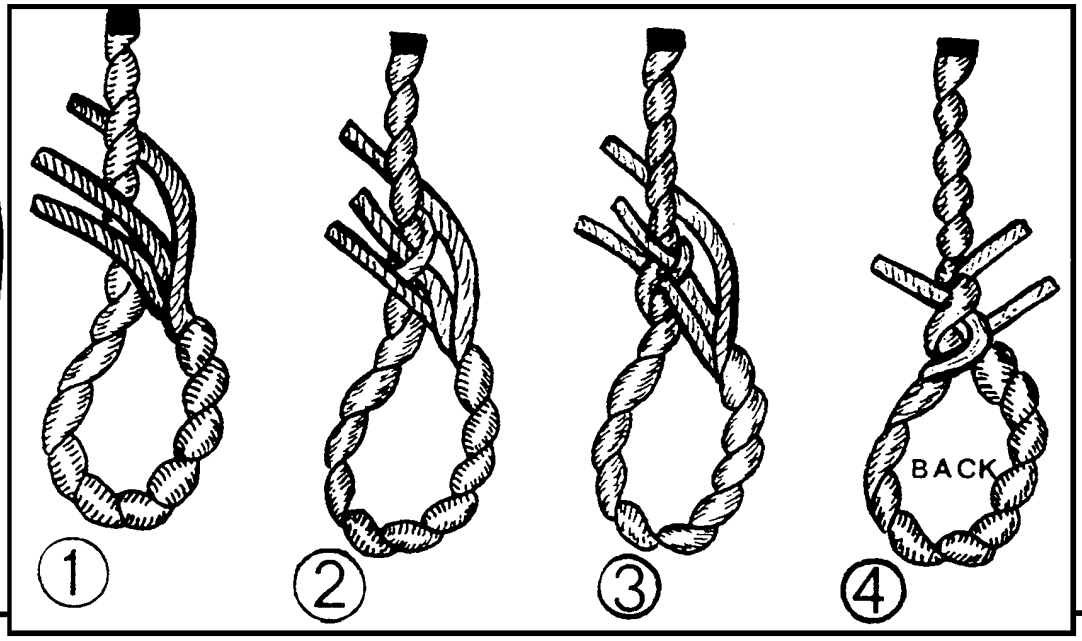
NOTE! THE OVER AND UNDER METHOD OF LAYING THE STRANDS IS COMMON TO ALL SPLICING.

see chart 43 for eye & short splice

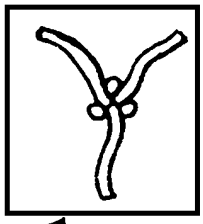
# PRO-PLAN CHART NO. 43.

## SPLICING.2

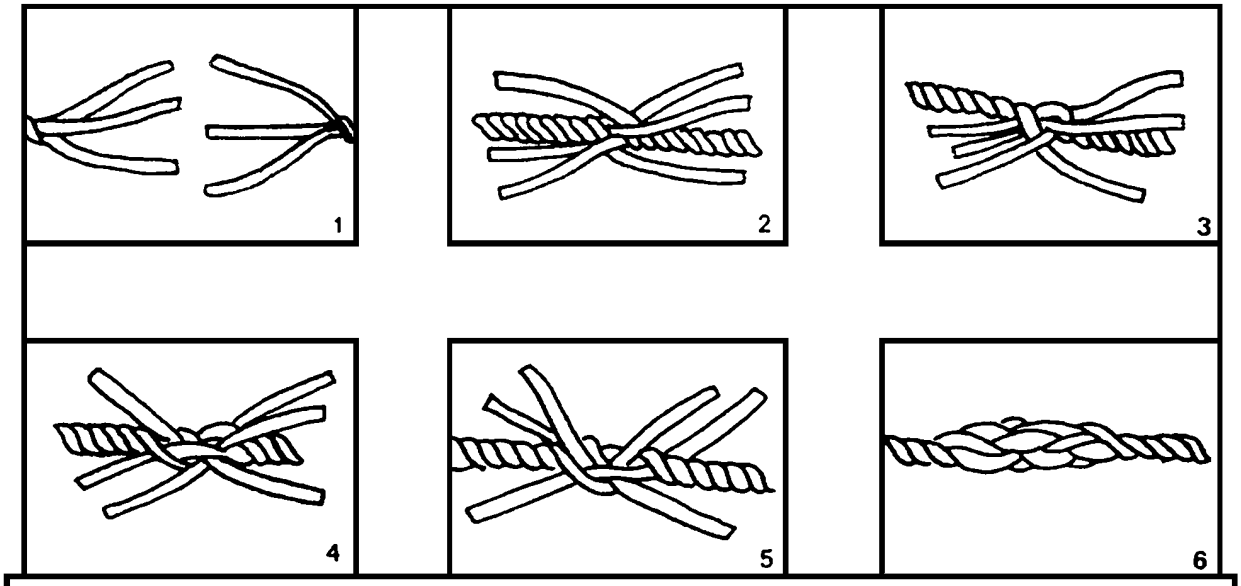
EYE & SHORT SPLICE




## EYE SPLICE



To make the Eye Splice, the rope is formed into a loop and the strands are woven in as shown. Note the 4th drawing shows the back of the splice. After laying the rope in this manner, the strands are interwoven as in the Back Splice - see Chart No. 42.
(With all splices there should always be one strand between each laid strand as shown in the diagram here)



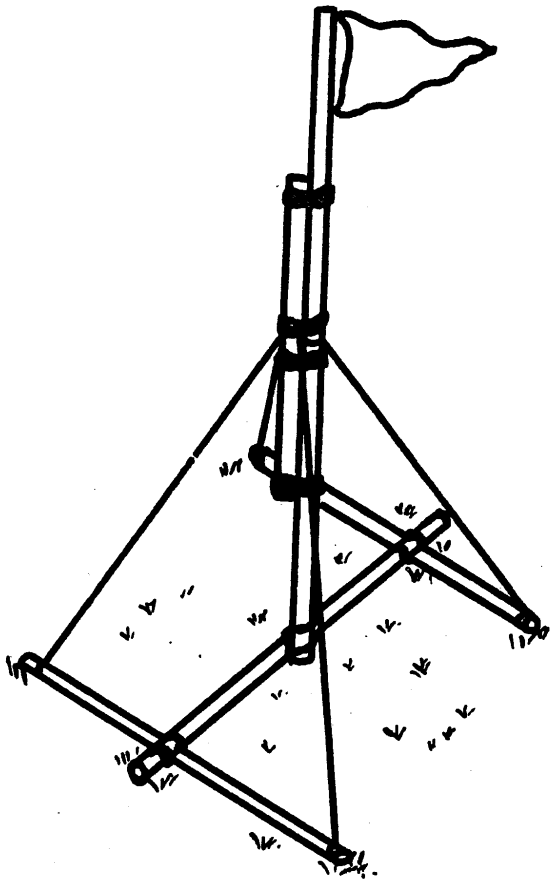

## SHORT SPLICE

To make a Short Splice, the ropes to be joined are unravelled for a distance and placed end to end with the strands alternating. This is called marrying. Then the strands are woven into the laid rope in the usual "over and under" manner. Don't forget to taper the ends before finishing to get a neat effect.

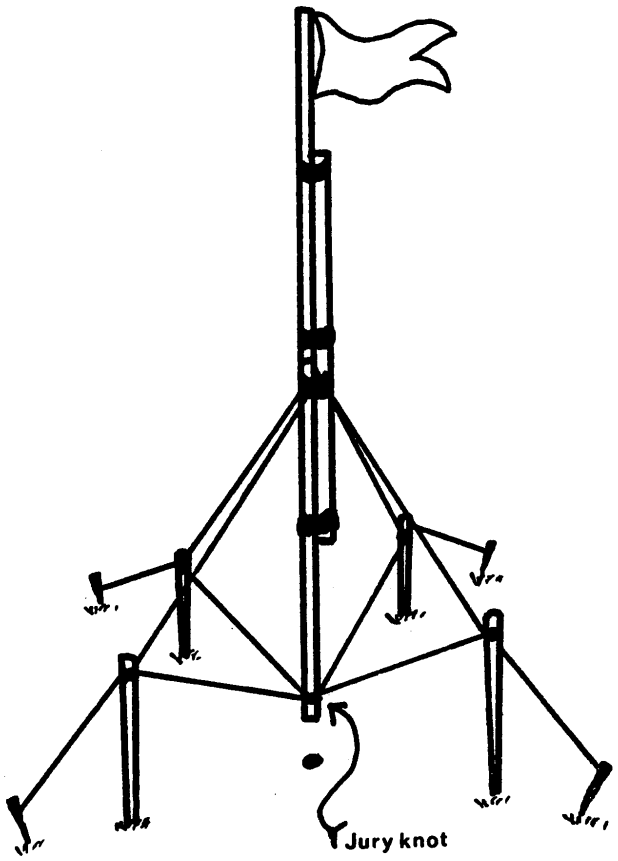
# PRO-PLAN CHART NO. 46.

## SIMPLE PIONEERING

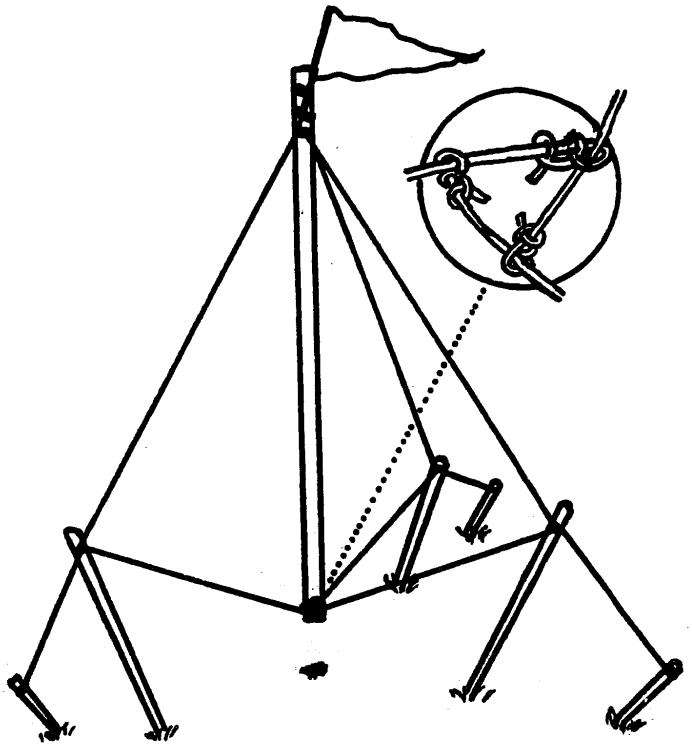
## FLAGPOLES & SKYLONS



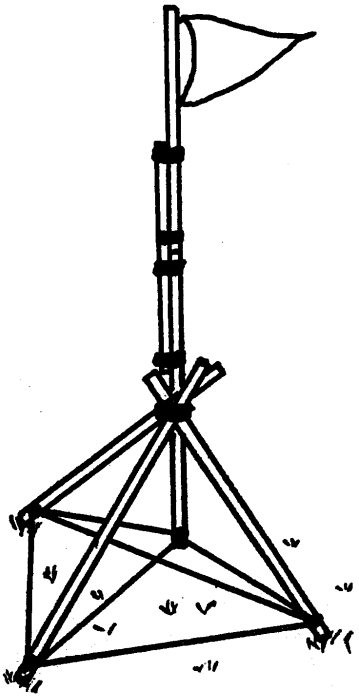
PORTABLE FLAGPOLE




FOUR STAY SKYLON



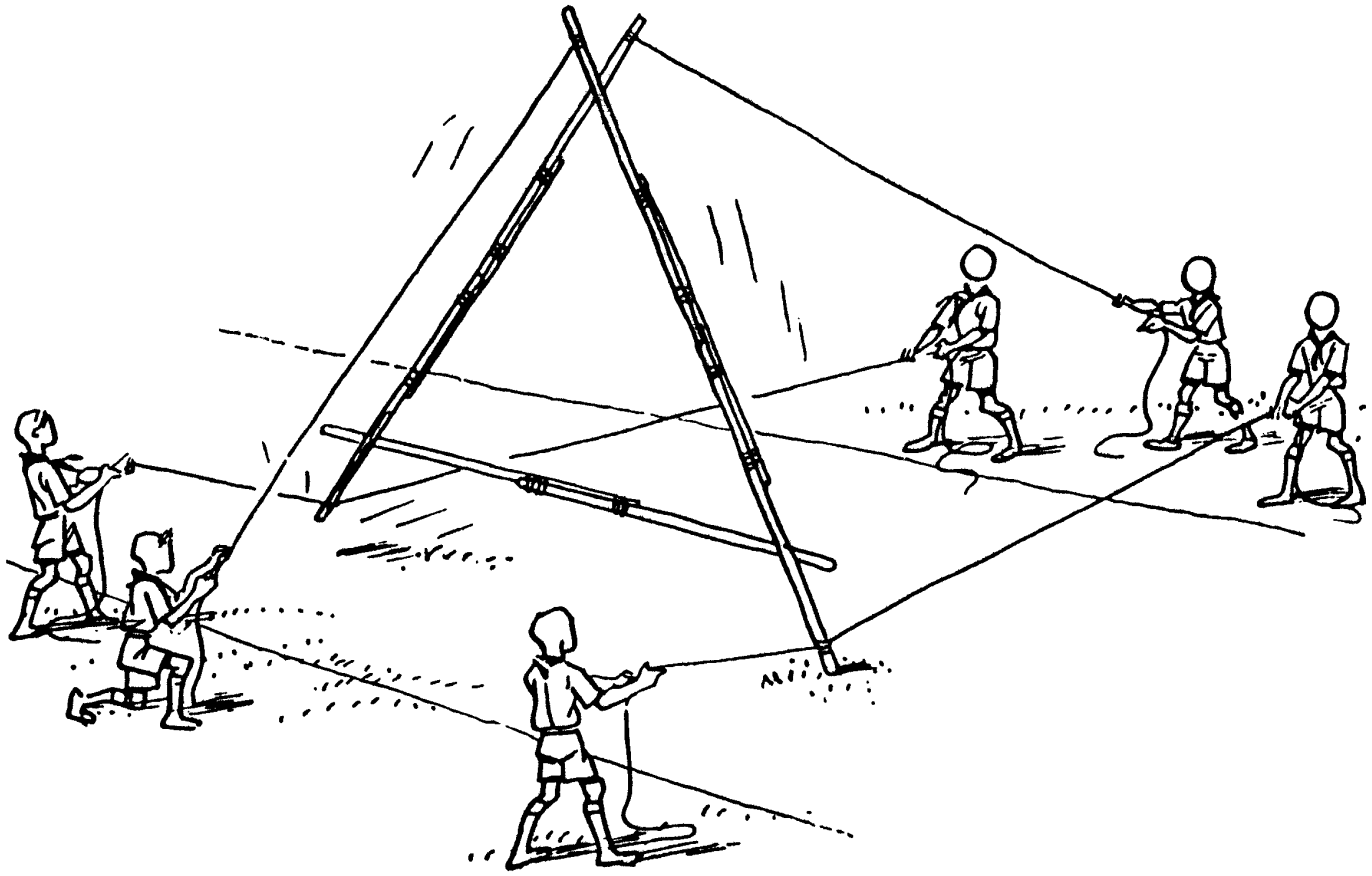
SIMPLE SKYLON



TRIPOD PORTABLE FLAGPOLE

# PRO-PLAN CHART NO. 64.

# PIONEERING PROJECTS



## The Giraffe

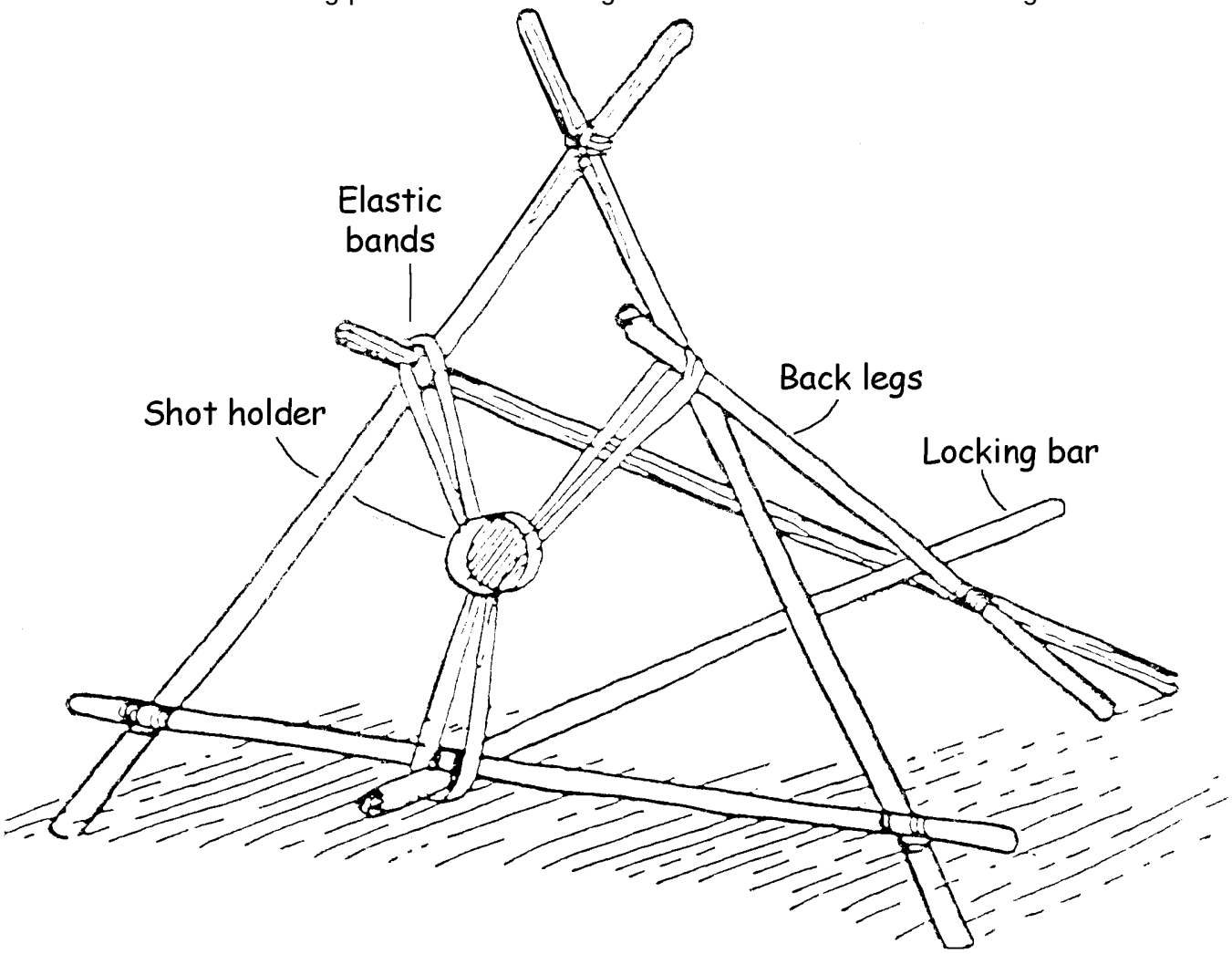
BUILD A PAIR OF SHEER LEGS
AND WITH LONG LINES ATTACHED,
"WALK" IT ACROSS A 6m GAP.

# PIONEERING PROJECTS

## The Newmarket Ballista

For this one you will need six Scout staffs, seven sisal lashings, and a 'shot-holder' consisting of an empty tin with three extra-strong elastic bands (cut from car inner tubes) attached to the base. This should be prepared before the Patrol meeting.

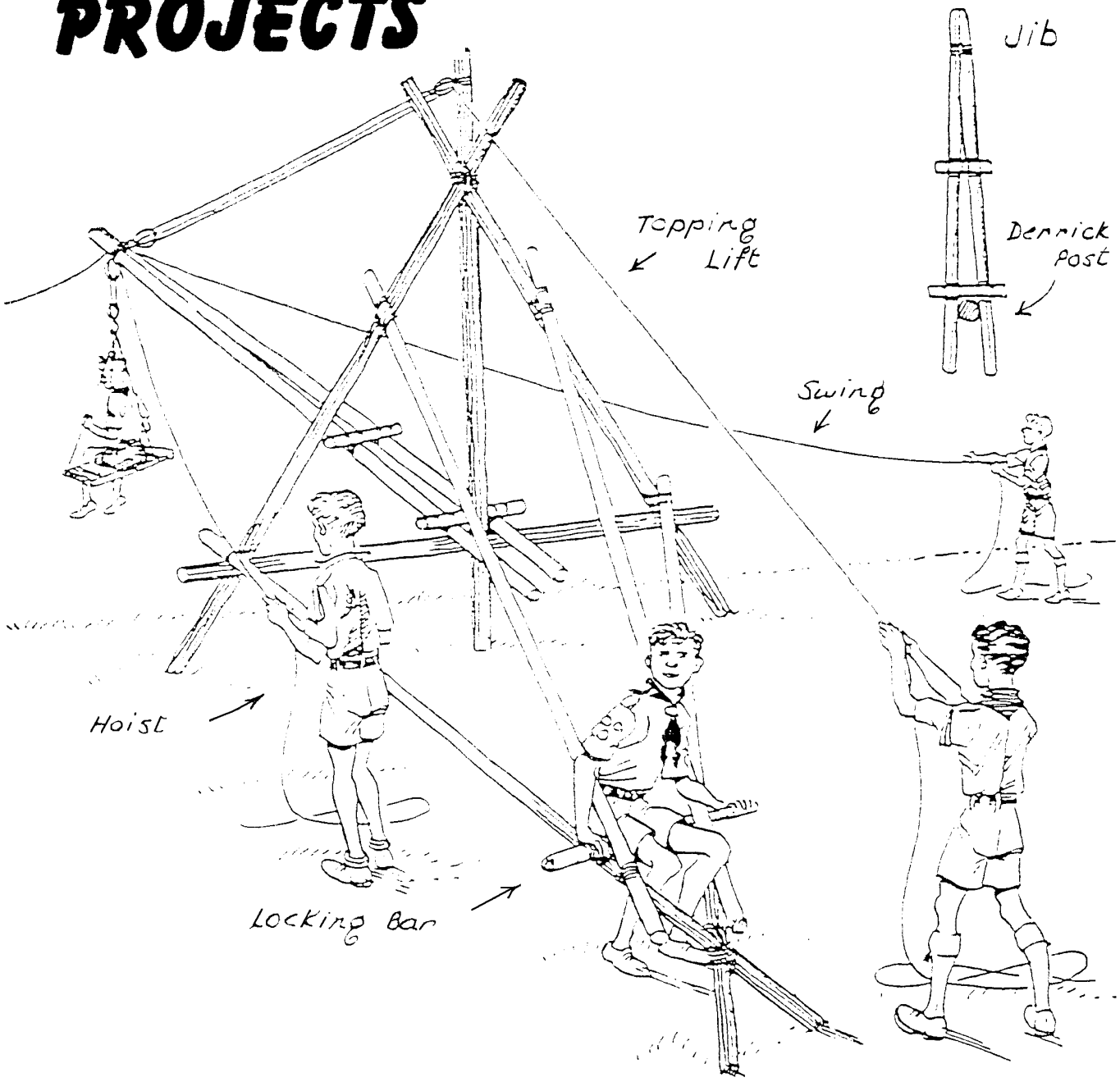
Note that the locking bar is moveable and is square-lashed to the crossbar of the sheer legs, but merely rests in the crutch of the back legs. The angle of fire can be adjusted simply by moving the locking bar in the crutch. The Ballista is locked in the firing position when the 'gunner' sits astride the back legs.




For "shot" use tennis balls, or tight balls of newspaper sealed with tape.

# PIONEERING PROJECTS

## The Brandon Transportable SWINGING DERRICK



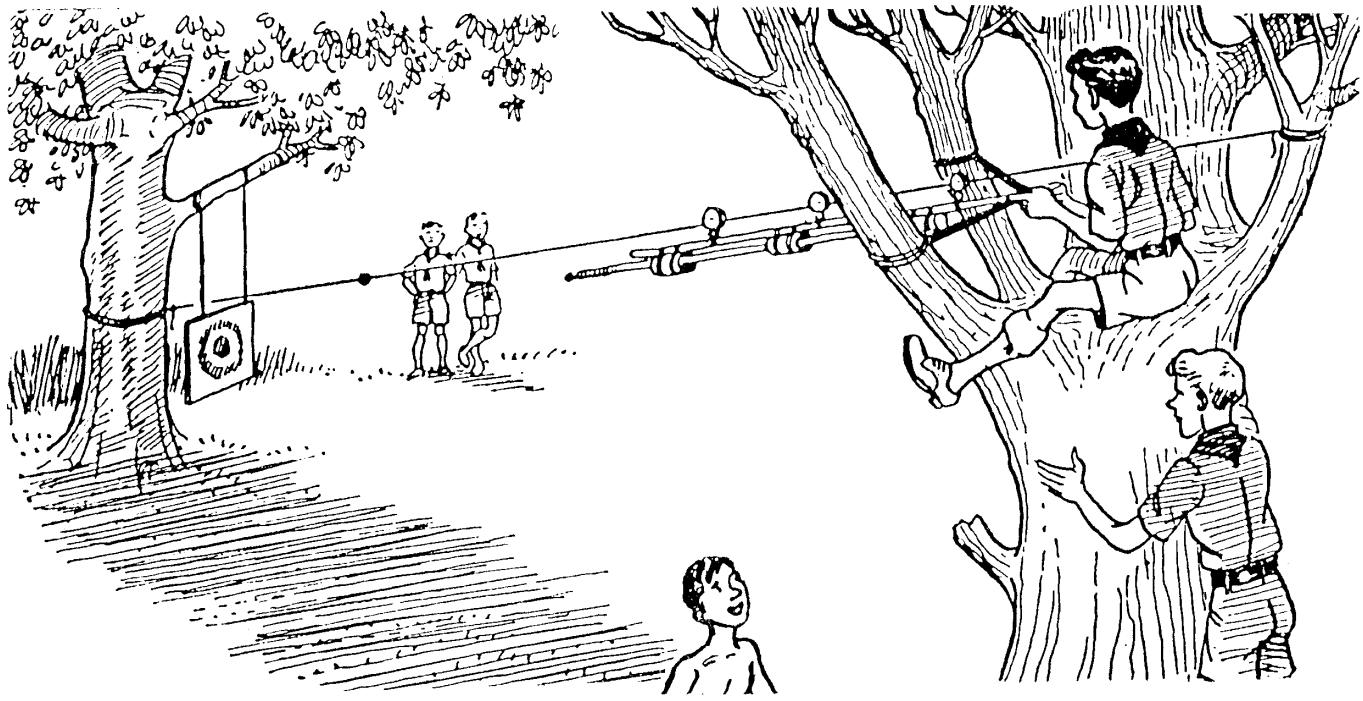

The DERRICK POST is lashed to the face of a pair of sheer legs which are supported by a second pair braced backwards to form an extended back leg with back transoms lashed from the legs of the forward sheers to the apex of the back leg to form a rigid structure. Note that any pioneering structure built of triangles will be rigid if the lashings are sound.

The JIB UNIT is a third pair of sheer legs that should fit snugly around the derrick post. Note that the back leg should be at least twice as long as the jib. The theory of the structure (which you are invited to prove or disprove by trial and error) is that a considerable load on the jib can be balanced by manual pressure alone on the end of the back leg.

# PIONEERING PROJECTS

## GUIDED MISSILE

### Try this great experiment!



Whether or not this crazy device will work is for you to discover. Certainly there will be plenty of interesting technical problems to solve.

The firepower is obtained from a strong rubber band cut from a car inner tube and secured catapult-fashion between two convenient branches. The 'carriage' (which is catapulted by this arrangement) is a Scout staff suspended from three small iron blocks with three small tins lashed on the underside. The first and second tins have their bottoms cut out to make tubes; the third is open at one end only.

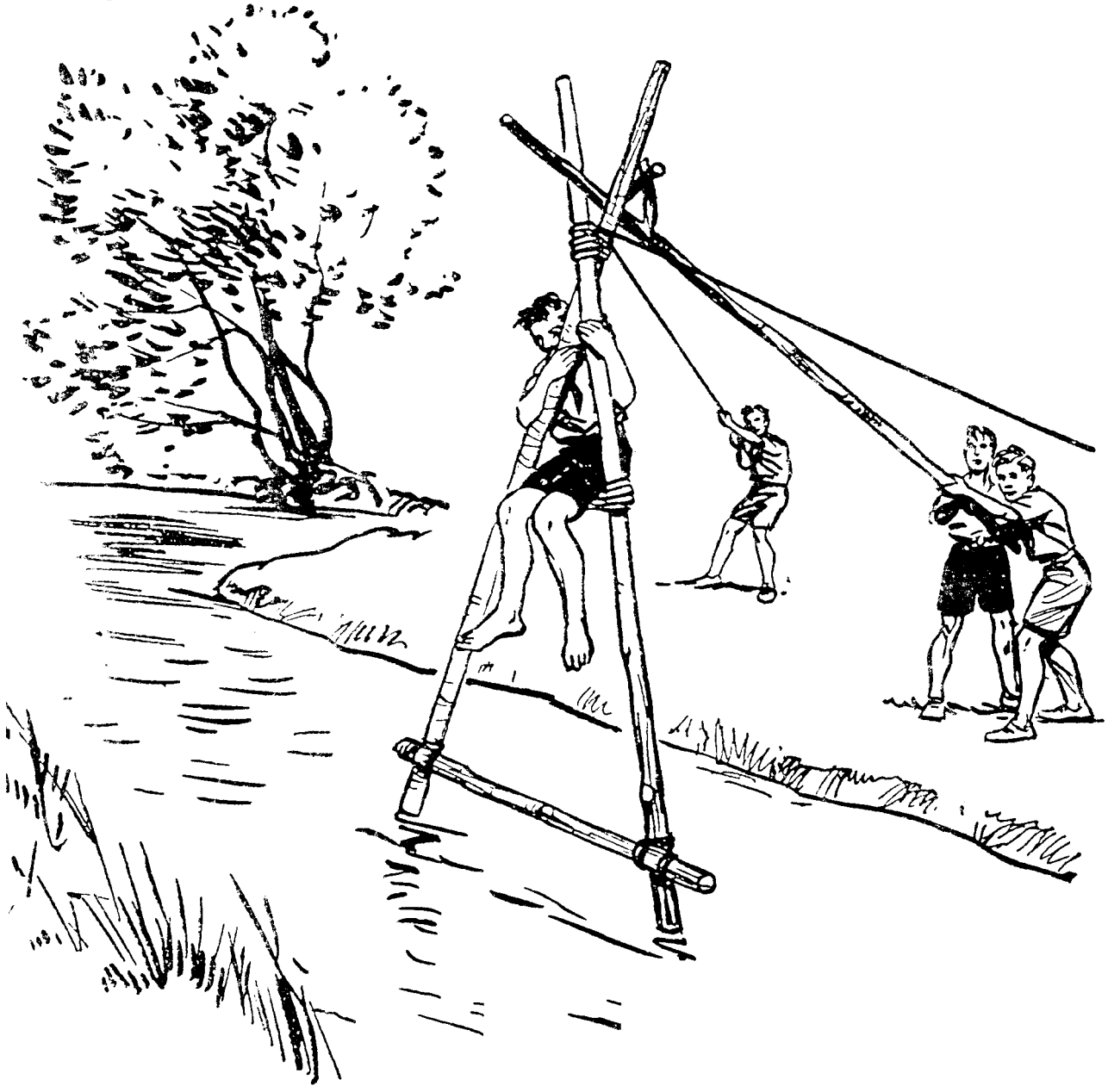
The 'missile' is a Scout staff with a sharp spike at one end. This lies in the three tins. The carriage is catapulted down a steep, very taut line. (Wire would give a much better result, if you can get it). A short distance above the target, another rubber band is bound on to the line to make a stopper. The carriage is checked abruptly as it reaches the stopper, and the missile shoots onwards o embed itself in the target.

That's the theory of the thing – now see if you can make it work!

# PRO-PLAN CHART NO. 68.

# PIONEERING PROJECTS

## The Scout Transporter



GEAR REQUIRED

Ropes:

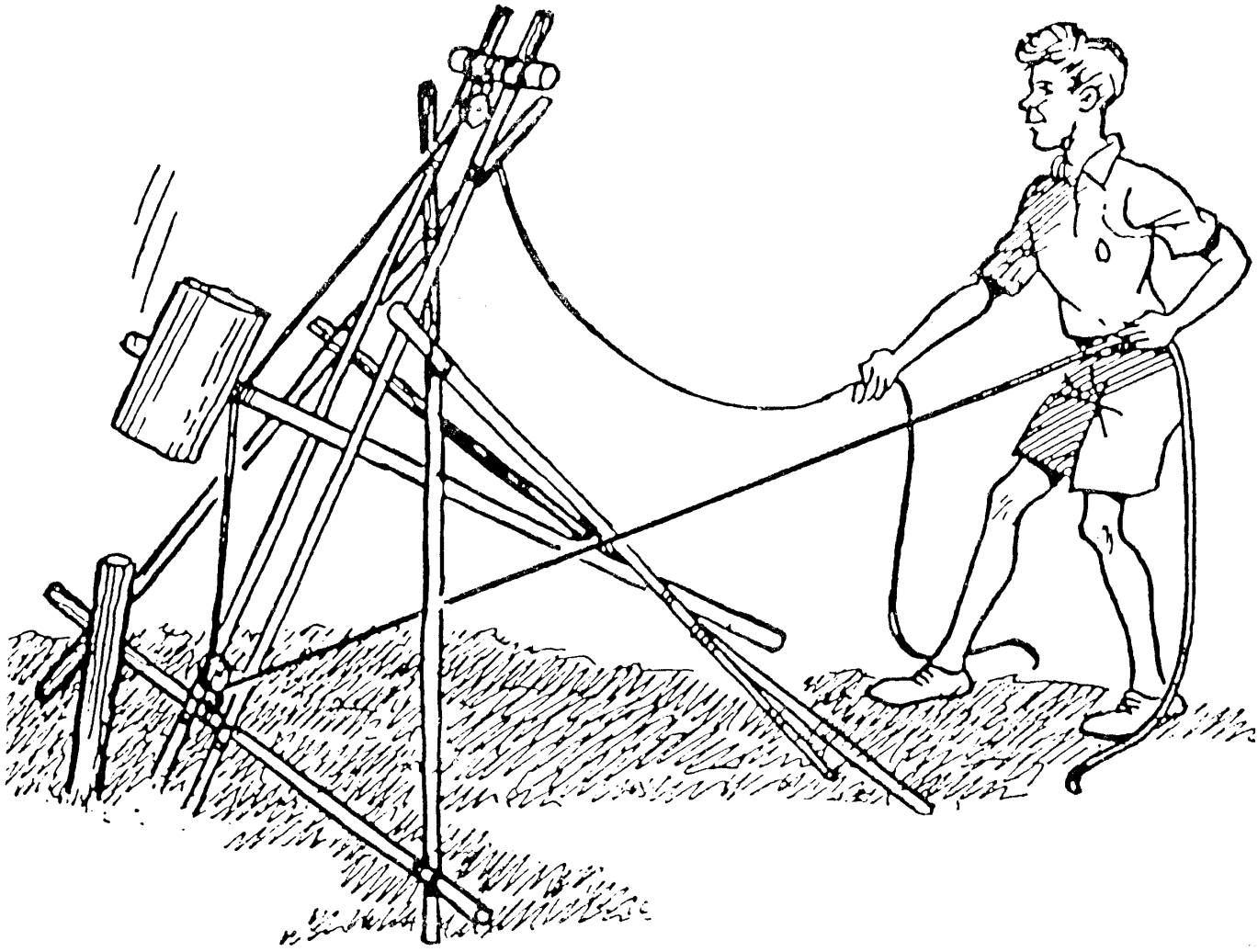
Two 10m, 20mm diameter guylines
Four 5m lashing ropes
Three 3m lashing ropes

Spars:

Three poles 4m to 5m in length
One 2m spar
One 1m spar

# PIONEERING PROJECTS

## The Basher

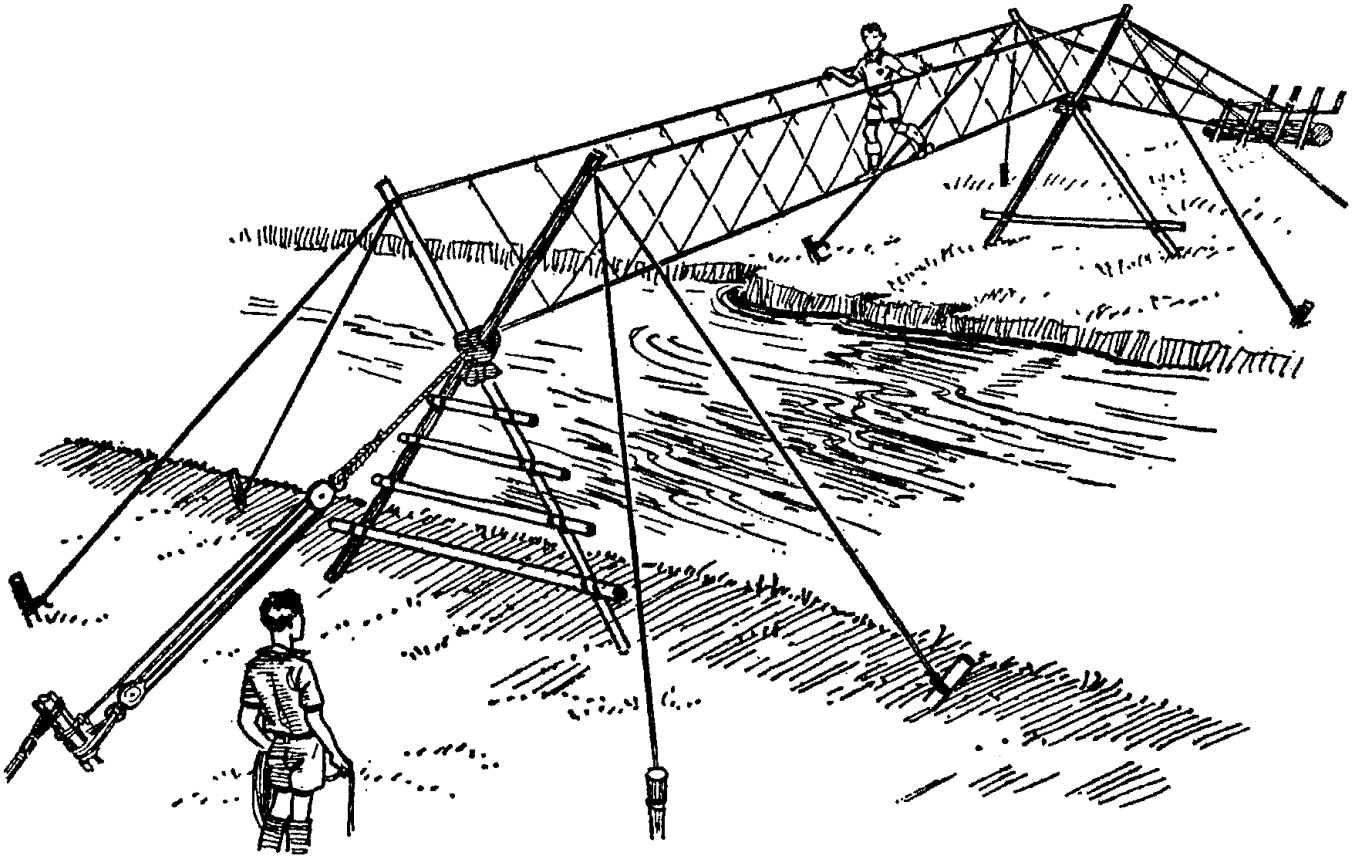


Invented by a Senior Scout from Dereham, Norfolk in England.

Note that the maul is loosely secured in the crutch of the two back legs. The haft should slide fairly snugly between the two guide bars at the front of the structure. The operating lines run through small iron blocks at the top and bottom of the frame.

# PIONEERING PROJECTS

## THE MONKEY BRIDGE



GEAR REQUIRED

Ropes:
- One 7cm hawser more than span between legs
- Two 5cm hawsers more than span between legs (or one 5cm hawser double length)
- One 5cm 10m for tackle

Spars:
- Four 5m
- Four 2m

Pickets:
- Six

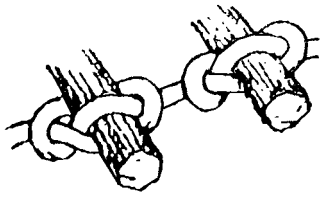
Lashings:
- Ten 3m

Blocks:
- One double
- One single

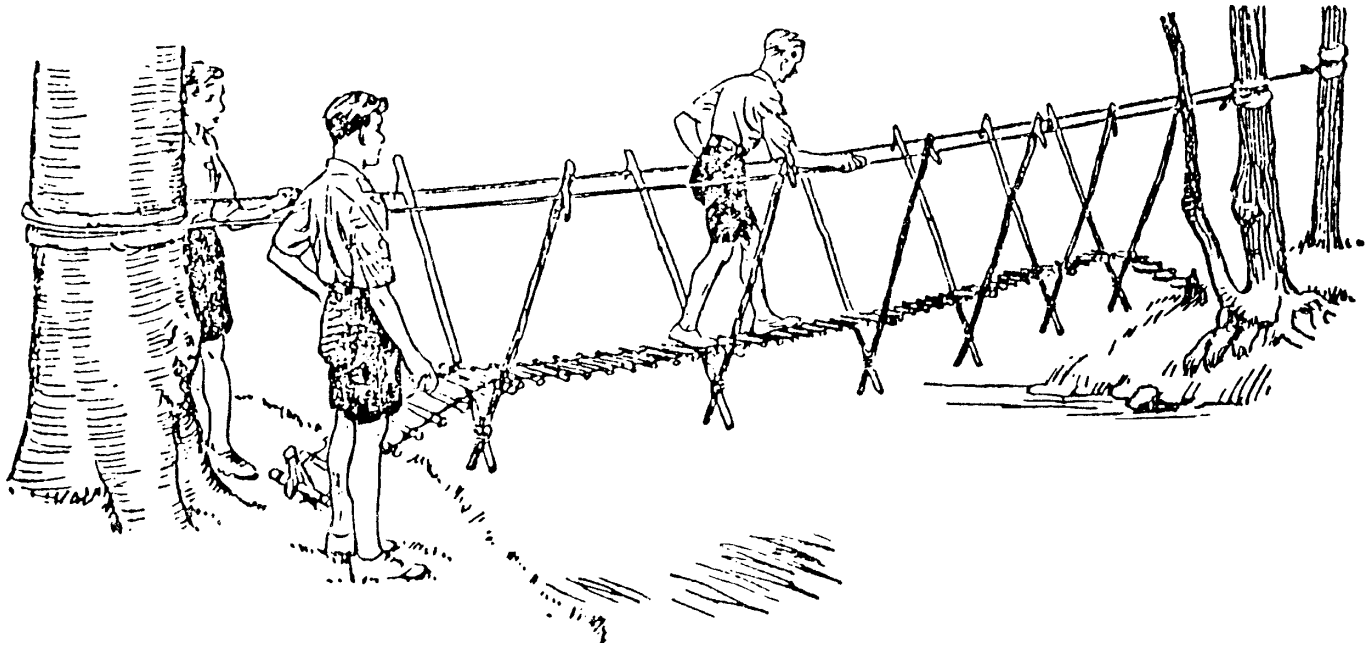
Oddments:
- Sacking
- Sisal for mooring
- Maul
- Light poles or cords for stays

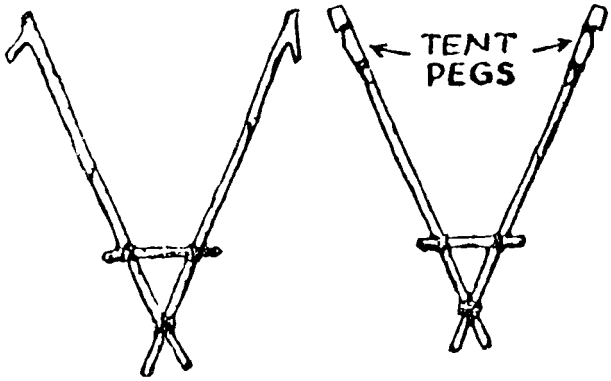
Spade

# PIONEERING PROJECTS



## THE BUSH BRIDGE






GEAR REQUIRED

Ropes:

One 5cm diameter hawser at least twice the width of the span

Spars:

15 to 20 light poles or 20 forked sticks

10 or so short 1m poles

Oddments

1 rope ladder more than the width of the span

Sacking

Maul

15-20 tent pegs unless forked sticks are used

Cord or sisal for lashing tent pegs to poles

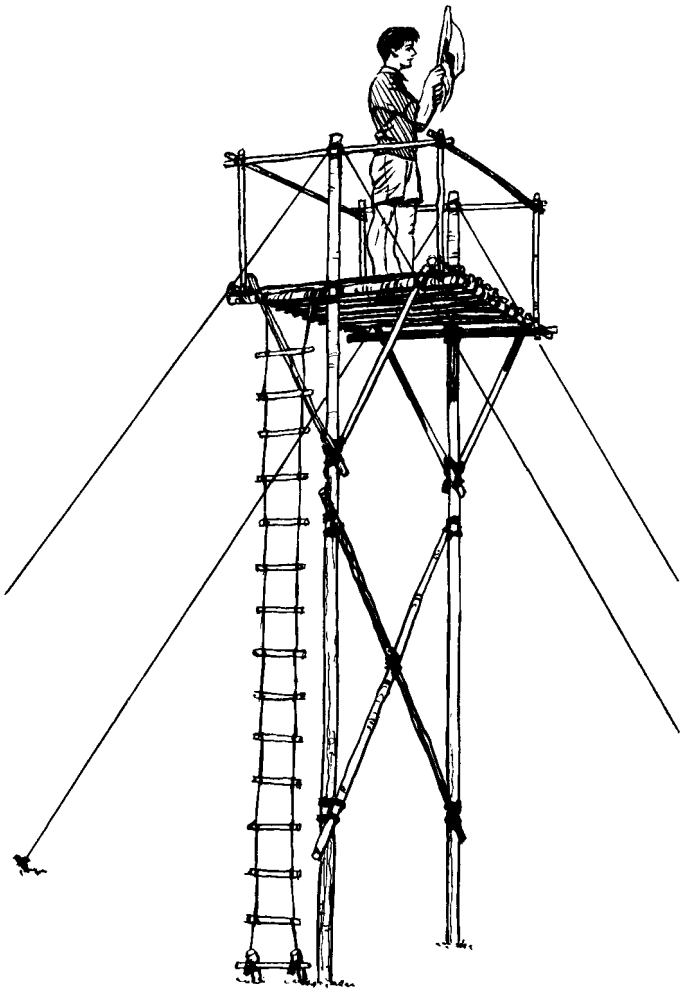
Lashings

30 light lashings (3 for each support)

# PRO-PLAN CHART NO. 72.

# PIONEERING PROJECTS

## STILT TOWER



GEAR REQUIRED

Ropes:
- Two 2.5cm, 16m

Spars:
- Two 6m
- Two 3m
- Four 2m, light
- Four 1.5m, light
- Sixteen 2m staves
- Four 1m staves

Lashings:
- Nine 5m
- Fourteen 3m
- Thirty light lines

Pickets:
- Four

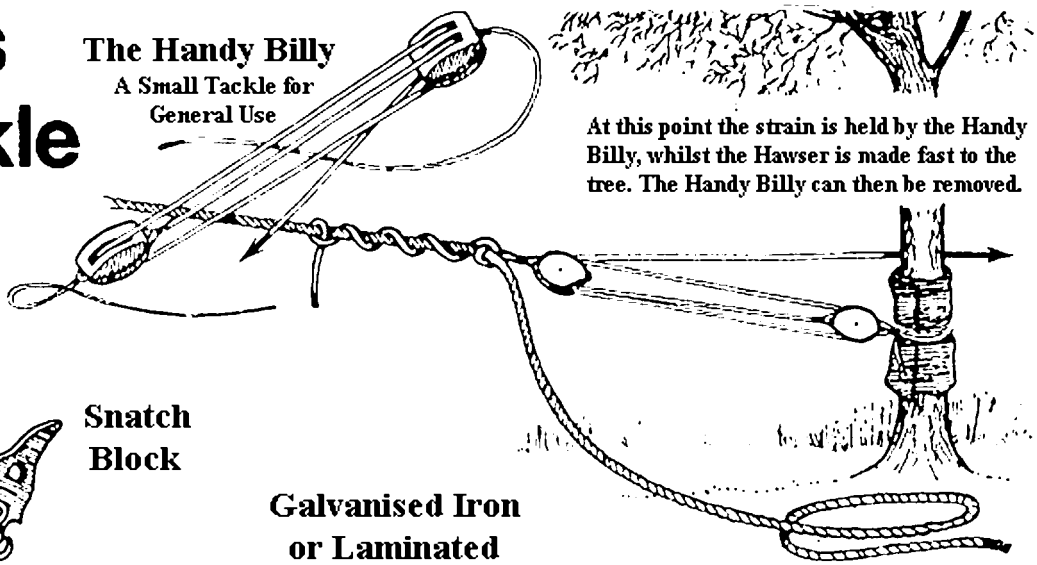
Oddments:
- Rope ladder

# PRO-PLAN CHART NO. 73.

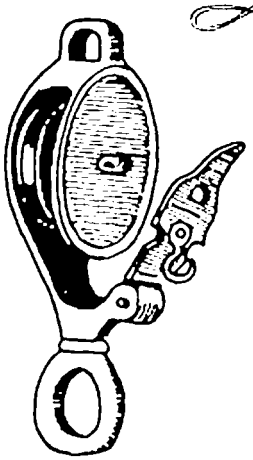
# Blocks & Tackle

## The Handy Billy

A Small Tackle for General Use

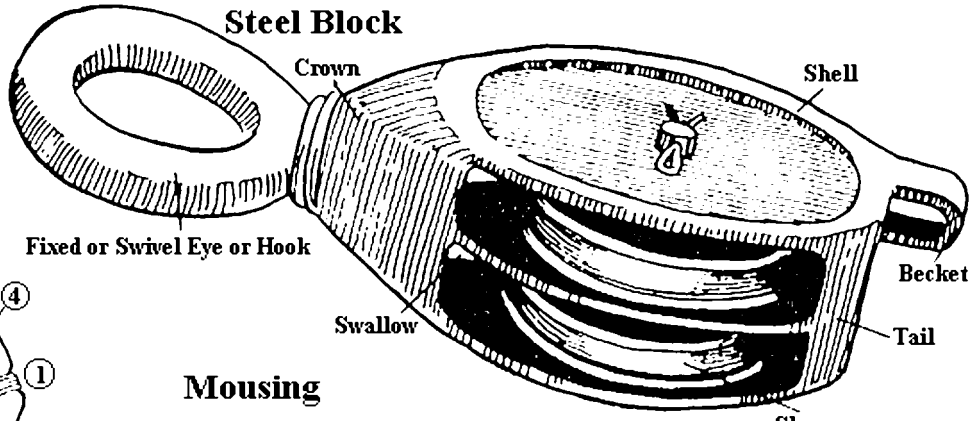


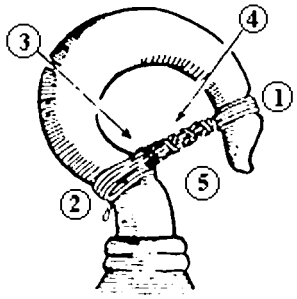
At this point the strain is held by the Handy Billy, whilst the Hawser is made fast to the tree. The Handy Billy can then be removed.



## Snatch Block

## Galvanised Iron or Laminated Steel Block

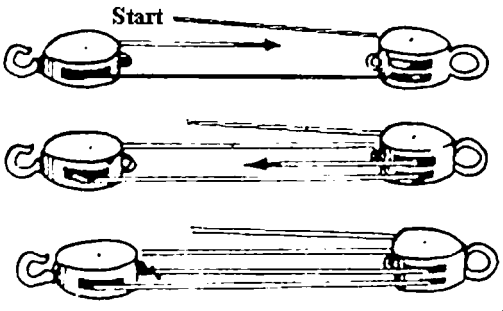


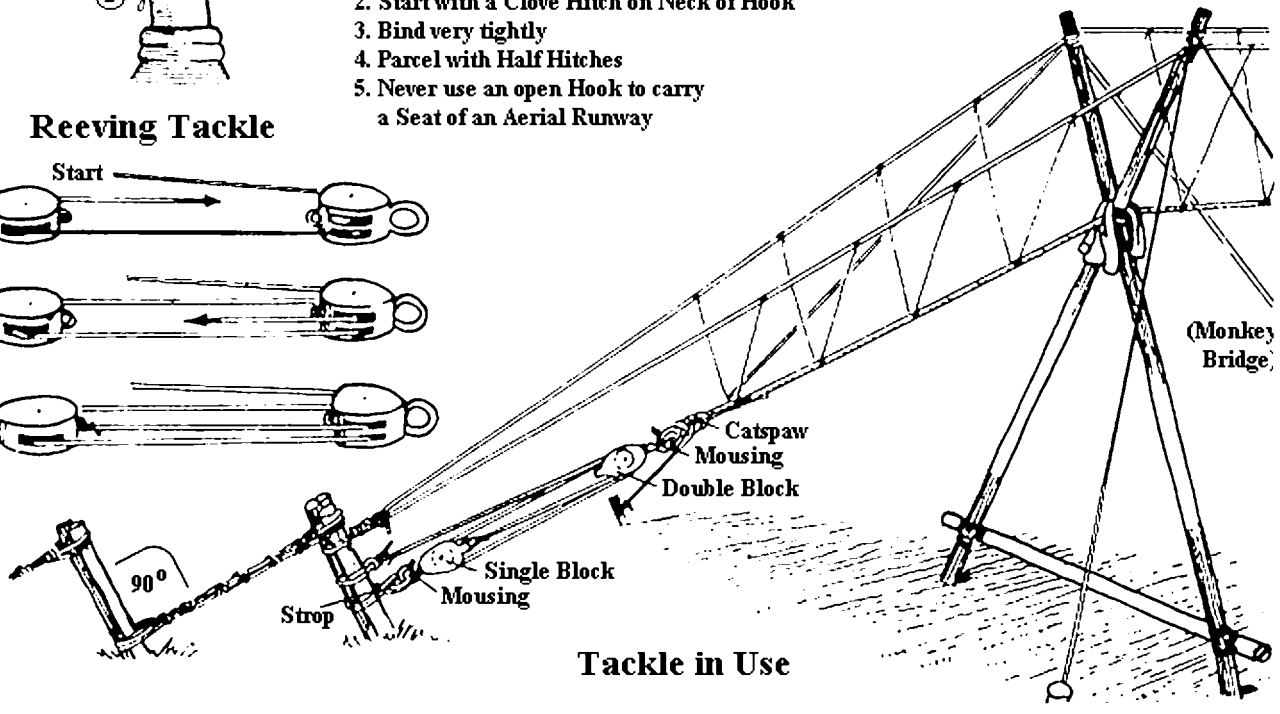




## Mousing

1. If necessary, make a shallow file cut to take the sisal Mousing
2. Start with a Clove Hitch on Neck of Hook
3. Bind very tightly
4. Parcel with Half Hitches
5. Never use an open Hook to carry a Seat of an Aerial Runway

## Reeving Tackle



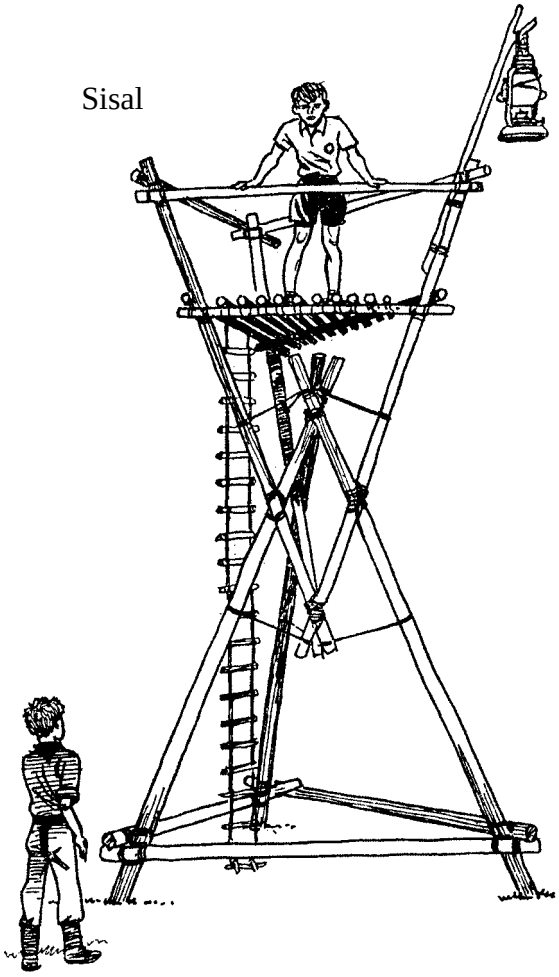



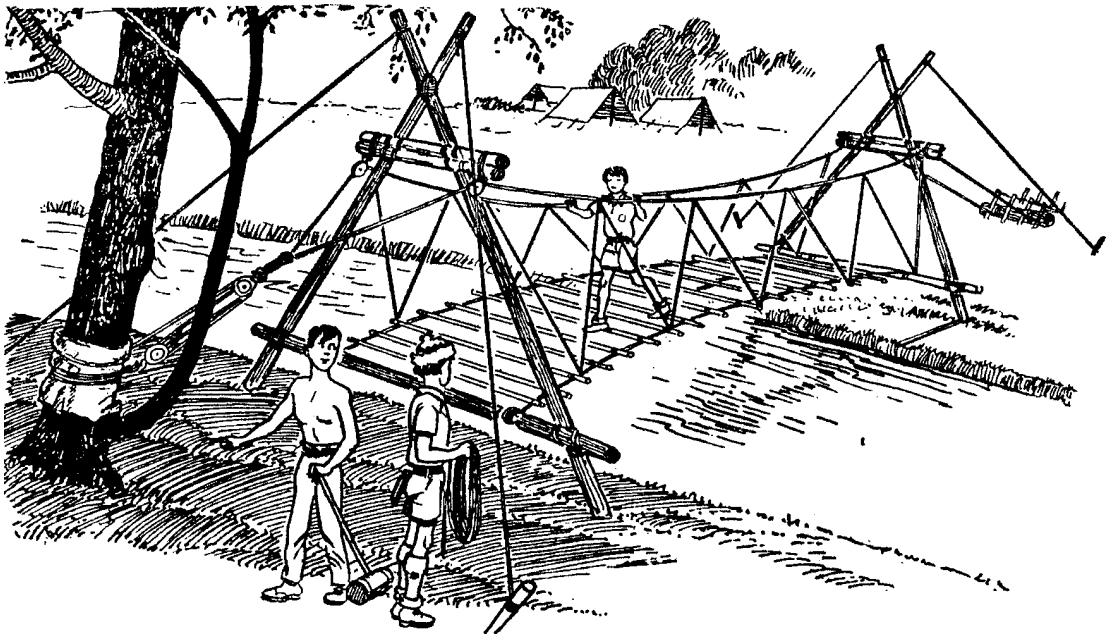

## Tackle in Use

# The Hourglass Tower

| | | | |
|---|---|---|---|
| Poles: | 100 mm x 5.4 m | 3 | |
| | 100 mm x 4.8 m | 3 | |
| | 100 mm x 3.6 m | 3 | |
| | 75 mm x 2.4 m | 3 | |
| | 75 mm x 1.8 m | 3 | |
| Staves: | 32 mm x 0.9 m | 25 | (ladder rungs) |
| | 32 mm x 1.8 m | 6 | (platform) |
| | 32 mm x 1.5 m | 6 | (platform) |
| | 32 mm x 0.9 m | 6 | (platform) |
| Rope: | 12 mm x 6 m | 40 | (lashings) |
| | 12 mm x 10 m | 2 | (tripod lashings) |
| | 12 mm x 15 m | 2 | (ladder) |
| | 7 mm x 10 m | 2 | (platform floor) |

Sundries:
Frapping Mallets
Serving Mallets
Mallet
Pickets
Tape Measure
Scissors
Chalk
Sisal



# The Abington Spring Bridge

| | | | |
|---|---|---|---|
| Poles: | 100 mm x 3.6 m | 4 | (sheer legs) |
| | 100 mm x 1.8 m | 2 | (sheer legs base) |
| Staves: | 32 mm x 0.9 m | 1 | (sheer legs steps) |
| | 32 mm x 0.6 m | 1 | |
| | 32 mm x 1.5 m | 1 | |
| Rope: | 12 mm x 6 m | 6 | (main lashings on sheer legs) |
| | 12 mm x 15 m | 4 | (guylines) |
| | 10 mm x 5 m | 6 | (steps to sheer legs) |
| | 10 mm x 6 m | 6 | (holdfasts) |
| | 16 mm x 20 m | 2 | (handrails) |
| | 26 mm x 25 m | 1 | (hawser) |
| | 7 mm x 3 m | 25 | (stringers) |
| Sundries: | 3-2 Block and Tackle (25 mm) | | |
| | Strop | | |
| | Log (1.5 m x 300 mm) | | |
| | Hessian | | |
| | Spare tent pegs | 10 | |
| | Frapping Mallets | | |
| | Serving Mallets | | |
| | Mallet | | |
| | Pickets | 22 | |
| | Tape Measure | | |
| | Sisal | | |
| | Whipping Twine | | |
| | Chalk | | |
| | Pick and Spade | | |